VSI-1104-A

SERVICE MANUAL

MIDEA AIRCONDITIONER
DC INVERTER
SPLIT WALL-MOUNTED TYPE
Vertu SERIES

CONTENTS

1. Precaution

1.1 Safety Precaution

- **To prevent injury to the user or other people and property damage, the following instructions must be followed.**
- **Incorrect operation due to ignoring instruction will cause harm or damage.**
- **Before service unit, be sure to read this service manual at first.**

1.2 Warning

➢ Installation

- **Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.**

  There is risk of fire or electric shock.

- **For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized service center.**

  Do not disassemble or repair the product, there is risk of fire or electric shock.

- **Always ground the product.**

  There is risk of fire or electric shock.

- **Install the panel and the cover of control box securely.**

  There is risk of fire of electric shock.

- **Always install a dedicated circuit and breaker.**

  Improper wiring or installation may cause fore or electric shock.

- **Use the correctly rated breaker of fuse.**

  There is risk of fire or electric shock.

- **Do not modify or extend the power cable.**

  There is risk of fire or electric shock.

- **Do not install, remove, or reinstall the unit by yourself(customer).**

  There is risk of fire, electric shock, explosion, or injury.

- **Be caution when unpacking and installing the product.**

Sharp edges could cause injury, be especially careful of the case edges and the fins on the condenser and evaporator.

■ **For installation, always contact the dealer or an Authorized service center.**

There is risk of fire, electric shock, explosion, or injury.

■ **Do not install the product on a defective installation stand.**

It may cause injury, accident, or damage to the product.

■ **Be sure the installation area does not deteriorate with age.**

If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.

■ **Do not let the air conditioner run for a long time when the humidity is very high and a door or a window is left open.**

Moisture may condense and wet or damage furniture.

■ **Take care to ensure that power cable could not be pulled out or damaged during operation.**

There is risk of fire or electric shock.

■ **Do not place anything on the power cable.**

There is risk of fire or electric shock.

■ **Do not plug or unplug the power supply plug during operation.**

There is risk of fire or electric shock.

■ **Do not touch (operation) the product with wet hands.**

There is risk of fire or electric shock.

■ **Do not place a heater or other appliance near the power cable.**

There is risk of fire and electric shock.

■ **Do not allow water to run into electric parts.**

It may cause fire, failure of the product, or electric shock.

■ **Do not store or use flammable gas or combustible near the product.**

There is risk of fire or failure of product.

■ **Do not use the product in a tightly closed space for a long time.**

Oxygen deficiency could occur.

■ **When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.**

Do not use the telephone or turn switches on or off.

There is risk of explosion or fire.

- **If strange sounds, or small or smoke comes from product. Turn the breaker off or disconnect the power supply cable.**

There is risk of electric shock or fire.

- **Stop operation and close the window in storm or hurricane. If possible, remove the product from the window before the hurricane arrives.**

There is risk of property damage, failure of product, or electric shock.

- **Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)**

There is risk of physical injury, electric shock, or product failure.

- **When the product is soaked (flooded or submerged), contact an Authorized service center.**

There is risk of fire or electric shock.

- **Be caution that water could not enter the product.**

There is risk of fire, electric shock, or product damage.

- **Ventilate the product from time to time when operating it together with a stove, etc.**

There is risk of fire or electric shock.

- **Turn the main power off when cleaning or maintaining the product.**

There is risk of electric shock.

- **When the product is not be used for a long time, disconnect the power supply plug or turn off the breaker.**

There is risk of product damage or failure, or unintended operation.

- **Take care to ensure that nobody could step on or fall onto the outdoor unit.**

This could result in personal injury and product damage.

➢ CAUTION

- **Always check for gas (refrigerant) leakage after installation or repair of product.**

Low refrigerant levels may cause failure of product.

- **Install the drain hose to ensure that water is drained away properly.**

A bad connection may cause water leakage.

- **Keep level even when installing the product.**

To avoid vibration of water leakage.

- **Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.**

It may cause a problem for your neighbors.

- **Use two or more people to lift and transport the product.**

Avoid personal injury.

- **Do not install the product where it will be exposed to sea wind (salt spray) directly.**

It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

➢ Operational

- **Do not expose the skin directly to cool air for long periods of time. (Do not sit in the draft).**

This could harm to your health.

- **Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigerant system.**

There is risk of damage or loss of property.

- **Do not block the inlet or outlet of air flow.**

It may cause product failure.

- **Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.**

There is risk of fire, electric shock, or damage to the plastic parts of the product.

- **Do not touch the metal parts of the product when removing the air filter. They are very sharp.**

There is risk of personal injury.

- **Do not step on or put anything on the product. (outdoor units)**

There is risk of personal injury and failure of product.

- **Always insert the filter securely. Clean the filter every two weeks or more often if necessary.**

A dirty filter reduces the efficiency of the air conditioner and could cause product malfunction or damage.

- **Do not insert hands or other object through air inlet or outlet while the product is operated.**

There are sharp and moving parts that could cause personal injury.

- **Do not drink the water drained from the product.**

It is not sanitary could cause serious health issues.

- **Use a firm stool or ladder when cleaning or maintaining the product.**

Be careful and avoid personal injury.

- **Replace the all batteries in the remote control with new ones of the same type. Do not mix old and mew batteries or different types of batteries.**

There is risk of fire or explosion.

- **Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.**

They may burn of explode.

- **If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote of the batteries have leaked.**

The chemical in batteries could cause burns or other health hazards

2. Function

Model List

Indoor units	**Outdoor units**
MSV1-18HRDN1-QC2F(D)	MOC2-18HDN1-QC2
MSV1-24HRDN1-QC2W	MOF-24HDN1-QC2W
MSV1-18HRDN1-QC2F(E)	MOC2-18HDN1-QC2
MSV1-09HRDN1-QC2	MOR-09HDN1-QC2
MSV1-12HRDN1-QC2	MOR-12HDN1-QC2
MSV1-09HRFN1-ND2E	MOC-09HDN1-ND2E
MSV1-12HRFN1-ND0E	MOC1-12HFN1-ND0E
MSV1-09HRDN1-QC8	MOC-09HDN1-QC8
MSV1-12HRDN1-QC4	MOC-12HDN1-QC4
MSV1-09HRDN1-QC2(D)	MOA-09HDN1-QC2
MSV1-12HRDN1-QC2(D)	MOB4-12HDN1-QC2

Indoor unit

- **Operation by remote controller**
- **Sensing by room temperature**
  Room temperature sensor.
  Pipe temperature sensor.
- **Room temperature control**
  Maintain the room temperature in accordance with the setting temperature.
- **Anti-freezing control in cooling**
  Prevent the water being frozen on evaporator by sensing the evaporator pipe temperature in cooling mode
- **Time Delay Safety control**
  Restarting is for approx. 3
- **Indoor fan speed control**
  Turbo, high, med, low, breeze.
- **Two-direction air vane**
  The unit will decide the louver direction according to operation mode.
- **Sleep mode auto control**
  The fan is turn to low speed (cooling/heating).
- **Independent dehumidification**
  The function is usually used in rainy days in springtime or damp areas.
- **Air flow Direction control**
  The louver can be set at the desired position or swing up and down automatically
- **Auto mode**
  The mode can be change by the room temperature.
- **Temp. Compensation**
- **Indoor golden fin**
- **Ionizer**
- **Self clean**
- **Follow me**
- **Timer function**
- **Self-diag. function**
- **Anti-cold function**
  Prevent the cold wind at the beginning of unit start.
- **Auto defrost**
- **Auto-restart function**
  When the power supply is interrupted and then restore, the air conditioners automatically restore the previous function setting.
- **Flexible wiring connection**

Outdoor unit

Power relay control

The unit has 3 minutes delay between continuously ON/OFF operations.

Low noise air flow system

Bird tail propeller fan makes the outdoor unit run more quietly.

Hydrophilic aluminum fin

The hydrophilic fin can improve the heating efficiency at operation mode.

4 way valve control

It is only operated in the heating operation mode except defrosting operation.

Anti-rust cabinet

Made from electrolytic zinc steel sheet and anti-rust coated components.

Valve protection cover

It protects the valves and prevents water from dripping.

Discharge pipe temperature protect

Crankcase heating cable

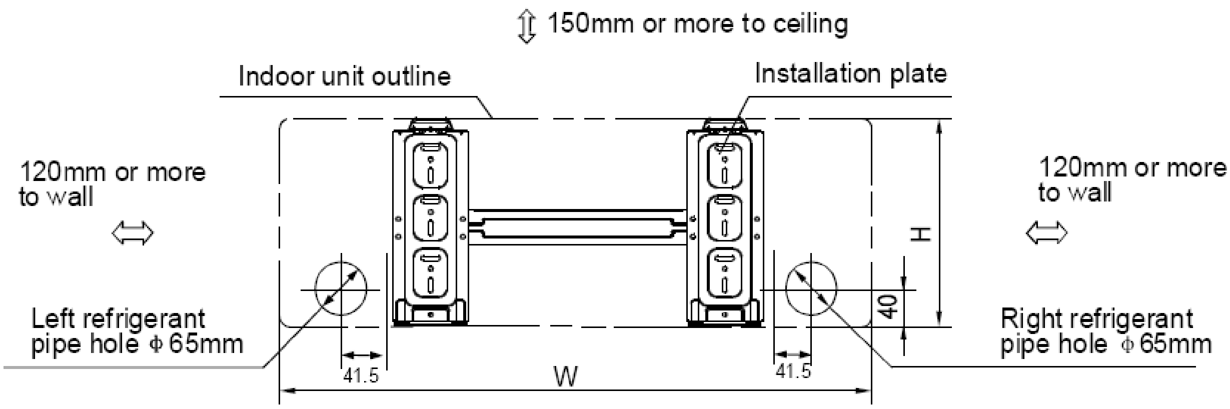
Driving heating at -15℃

3. Dimension

3.1 Indoor Unit

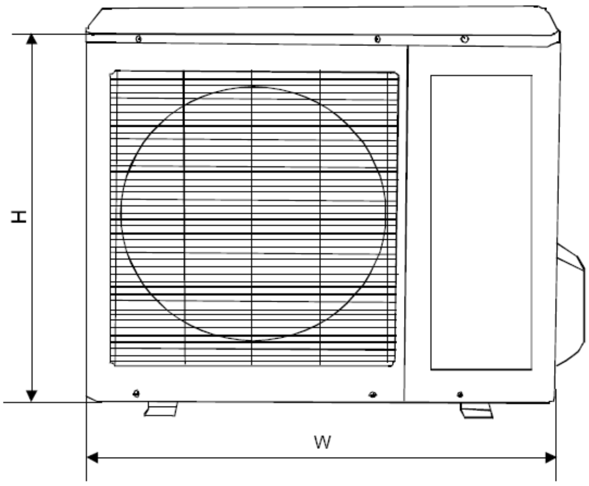


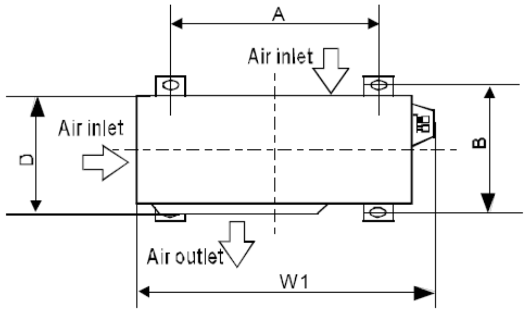




Model	Dimension (mm)		
	W	H	D
MSV1-09HRDN1-QC2 MSV1-09HRDN1-QC2(D)	795	270	165
MSV1-12HRDN1-QC2 MSV1-09HRFN1-ND2E MSV1-12HRFN1-ND0E MSV1-09HRDN1-QC8 MSV1-12HRDN1-QC4 MSV1-12HRDN1-QC2(D)	845	286	165
MSV1-18HRDN1-QC2F(D) MSV1-18HRDN1-QC2F(E)	995	292	194
MSV1-24HRDN1-QC2W	1080	320	200

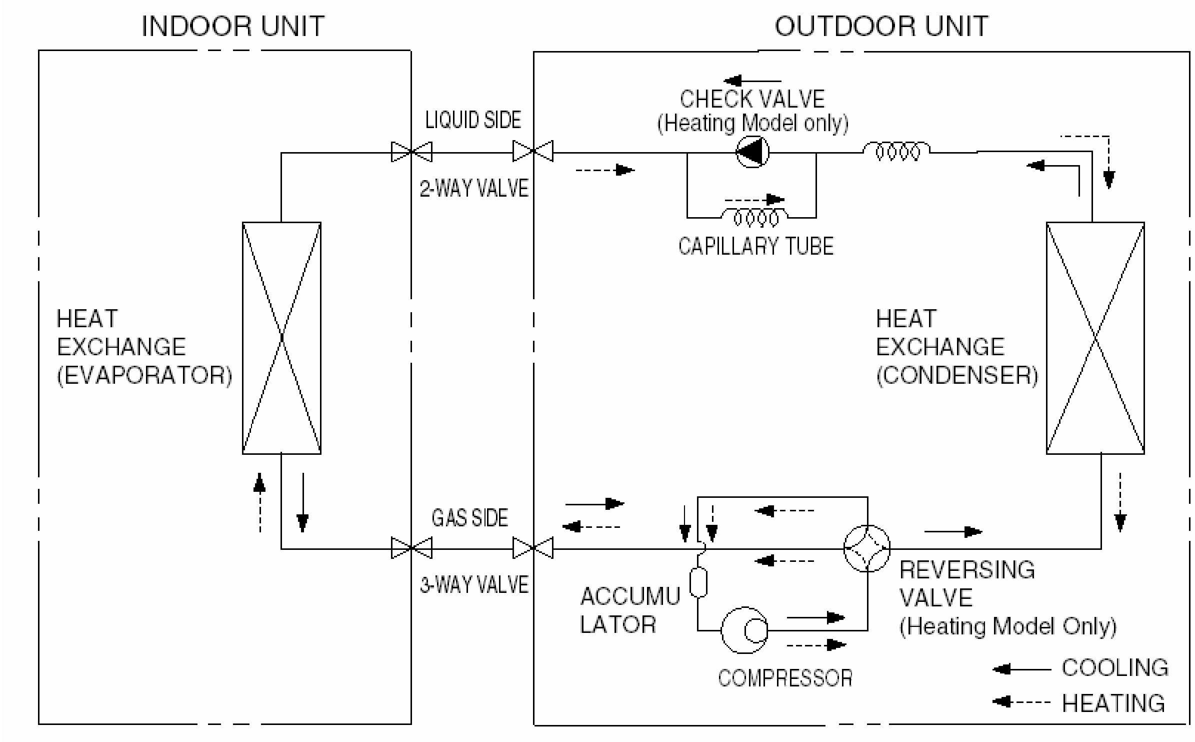
3.2 Outdoor Unit





Model	Dimension (mm)					
	W	D	H	W1	A	B
MOR-09HDN1-QC2 MOR-12HDN1-QC2	670	250	540	715	484	275
MOC2-18HDN1-QC2 MOC-09HDN1-ND2E MOC1-12HFN1-ND0E MOC-12HDN1-QC4 MOC-09HDN1-QC8	760	285	590	823	530	290
MOF-24HDN1-QC2W	845	335	695	918	560	335
MOA-09HDN1-QC2	700	235	535	760	458	250
MOB4-12HDN1-QC2	780	250	540	838	549	276

4. Refrigerant Cycle Diagram

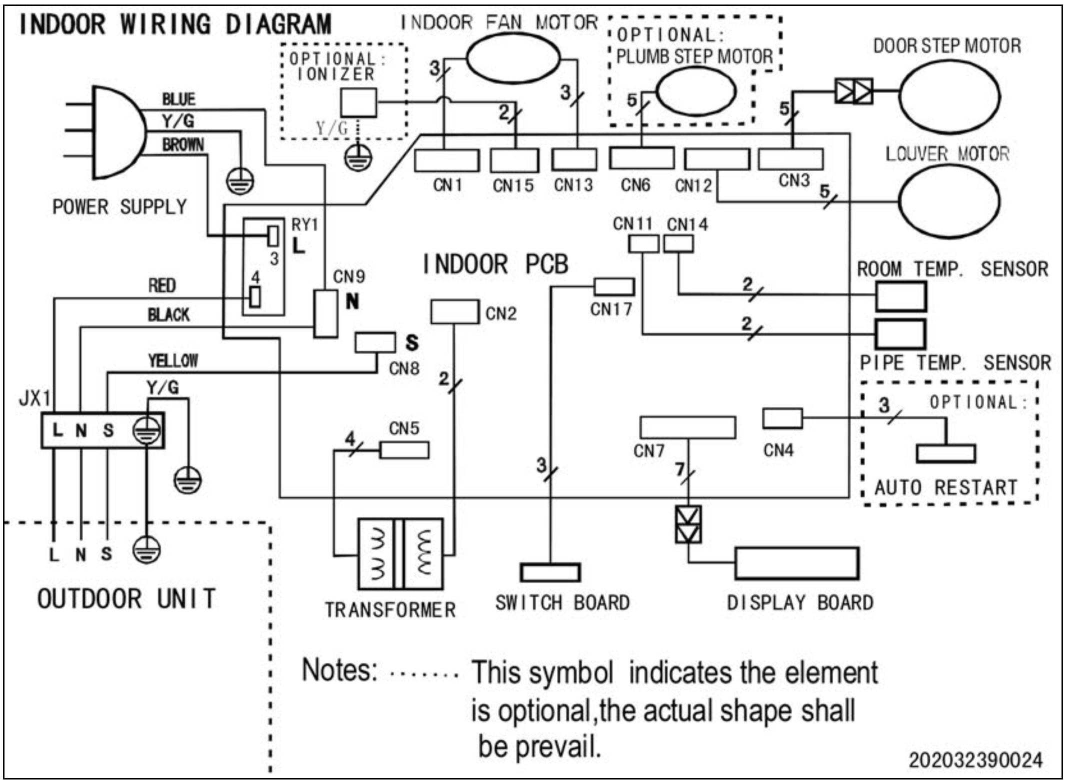


5. Wiring Diagram

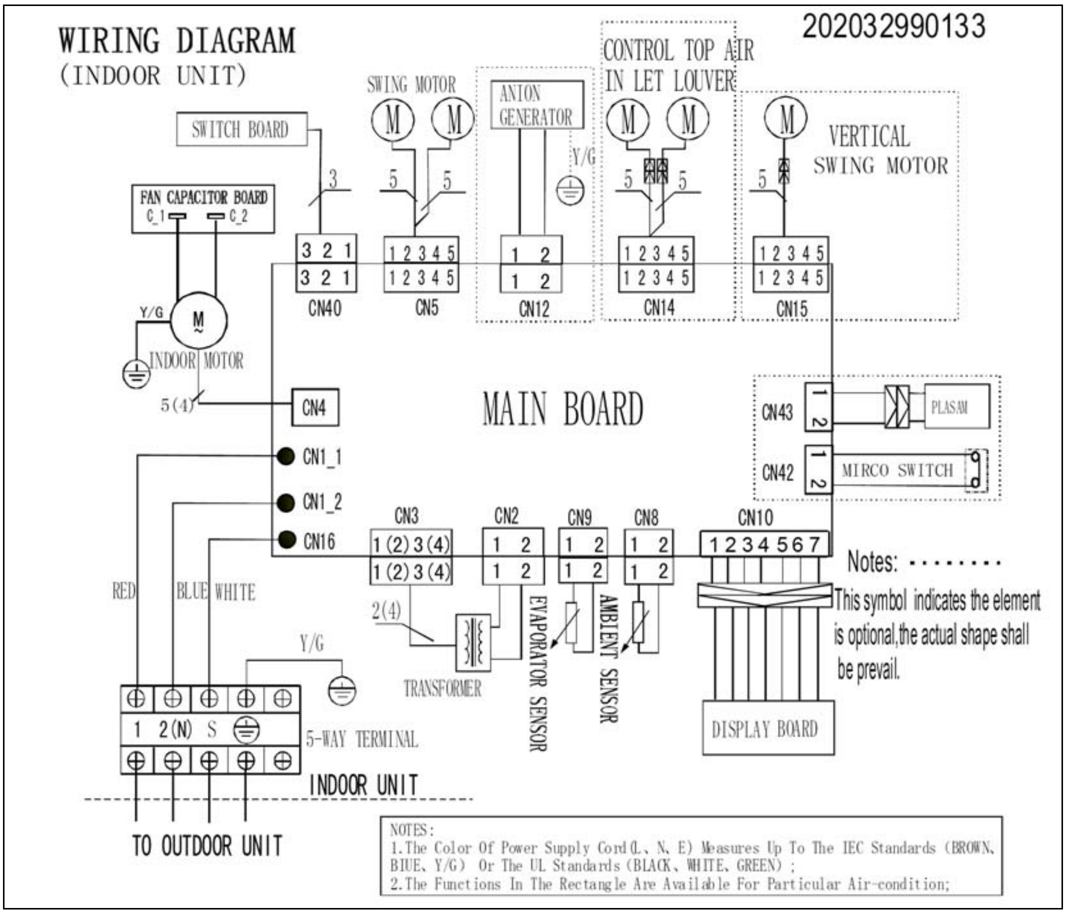
5.1 Indoor Unit

MSV1-09HRDN1-QC2   MSV1-12HRDN1-QC2   MSV1-18HRDN1-QC2F(D)

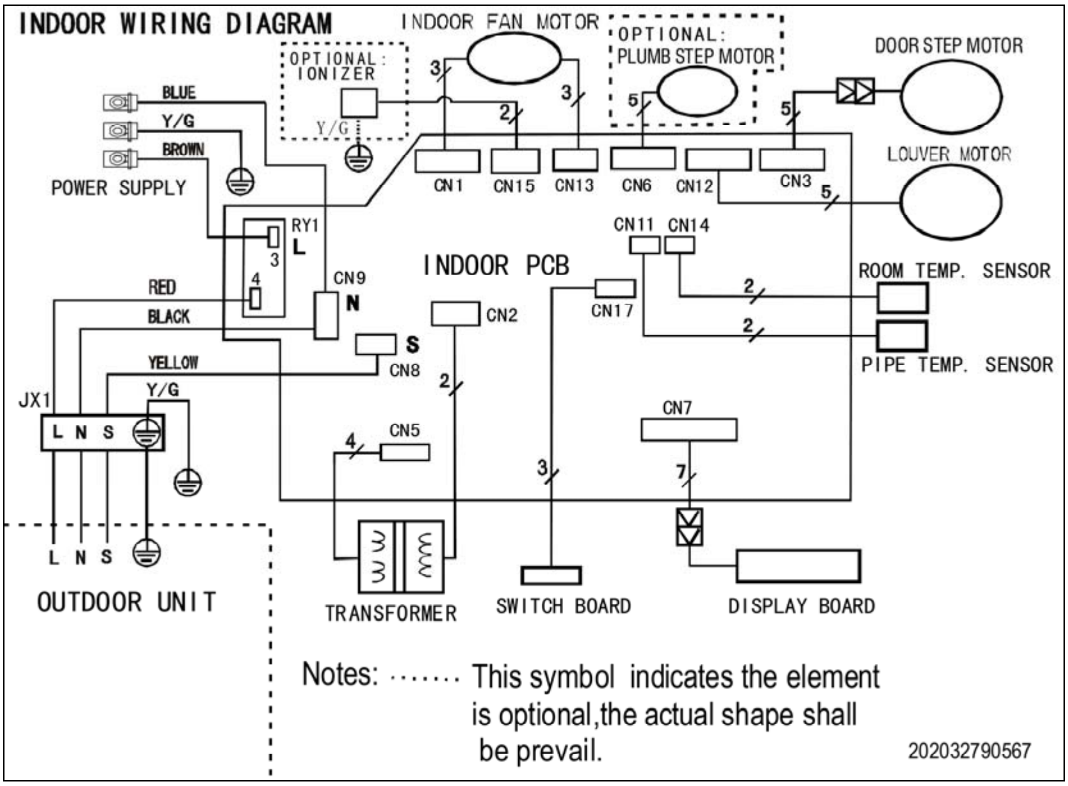
MSV1-09HRDN1-QC8   MSV1-12HRDN1-QC4   MSV1-09HRDN1-QC2(D)   MSV1-12HRDN1-QC2(D)



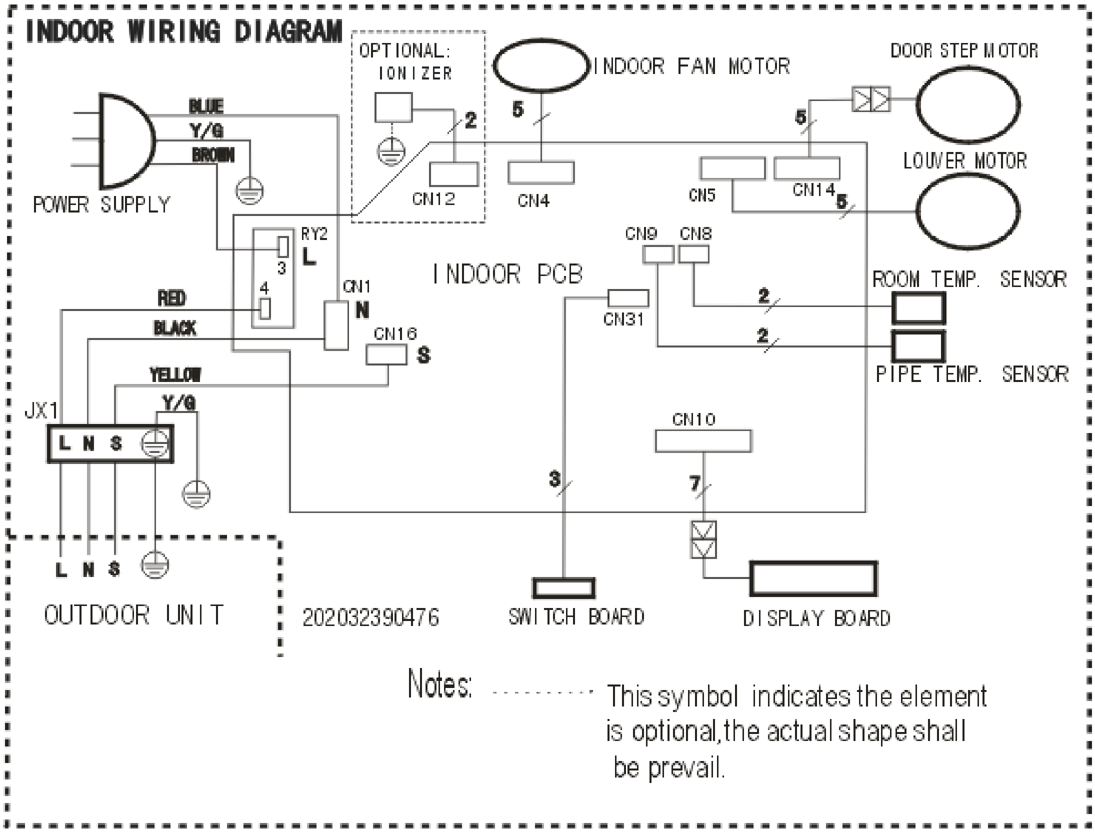
MSV1-24HRDN1-QC2W



MSV1-18HRDN1-QC2F(E)

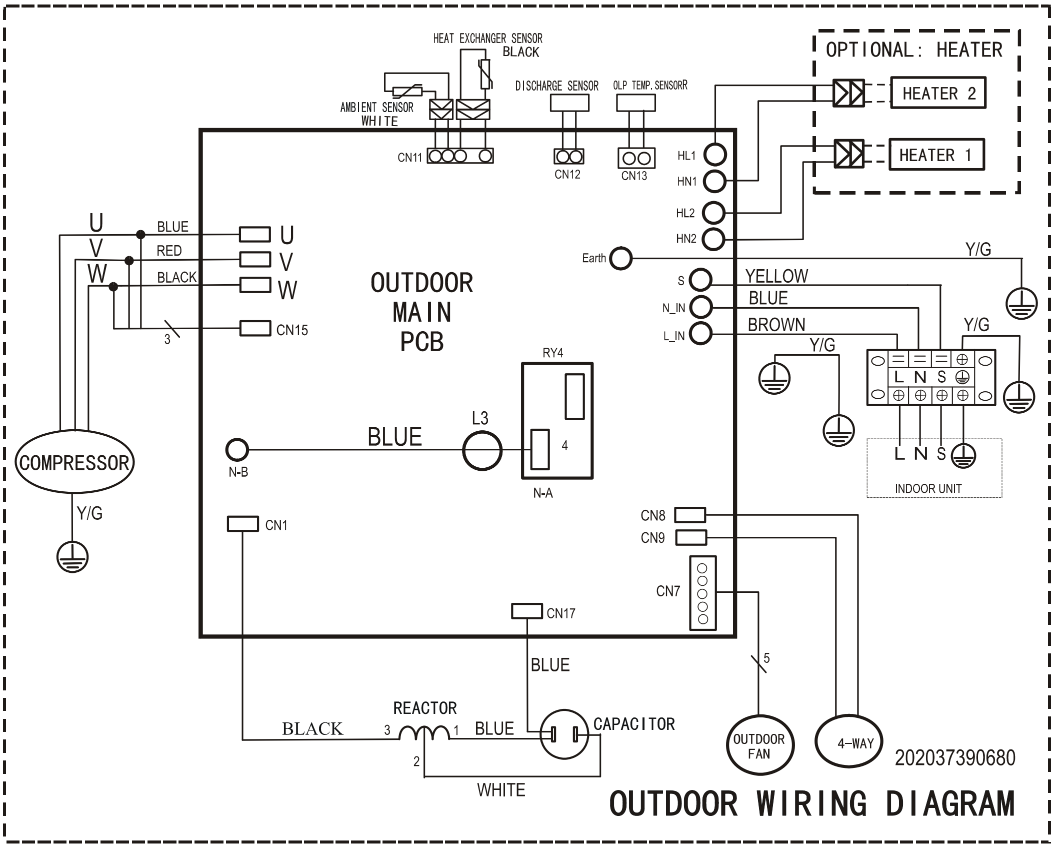


MSV1-09HRFN1-ND2E MSV1-12HRFN1-ND0E

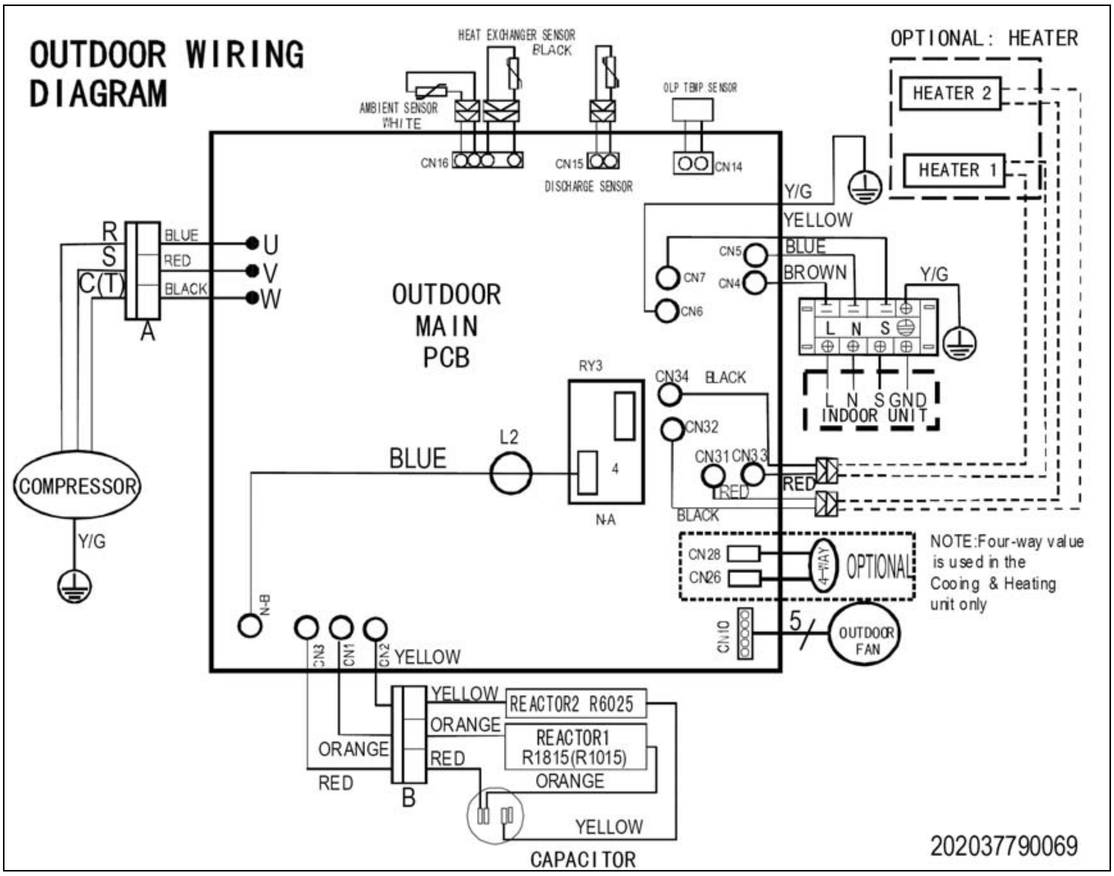


5.2 Outdoor Unit

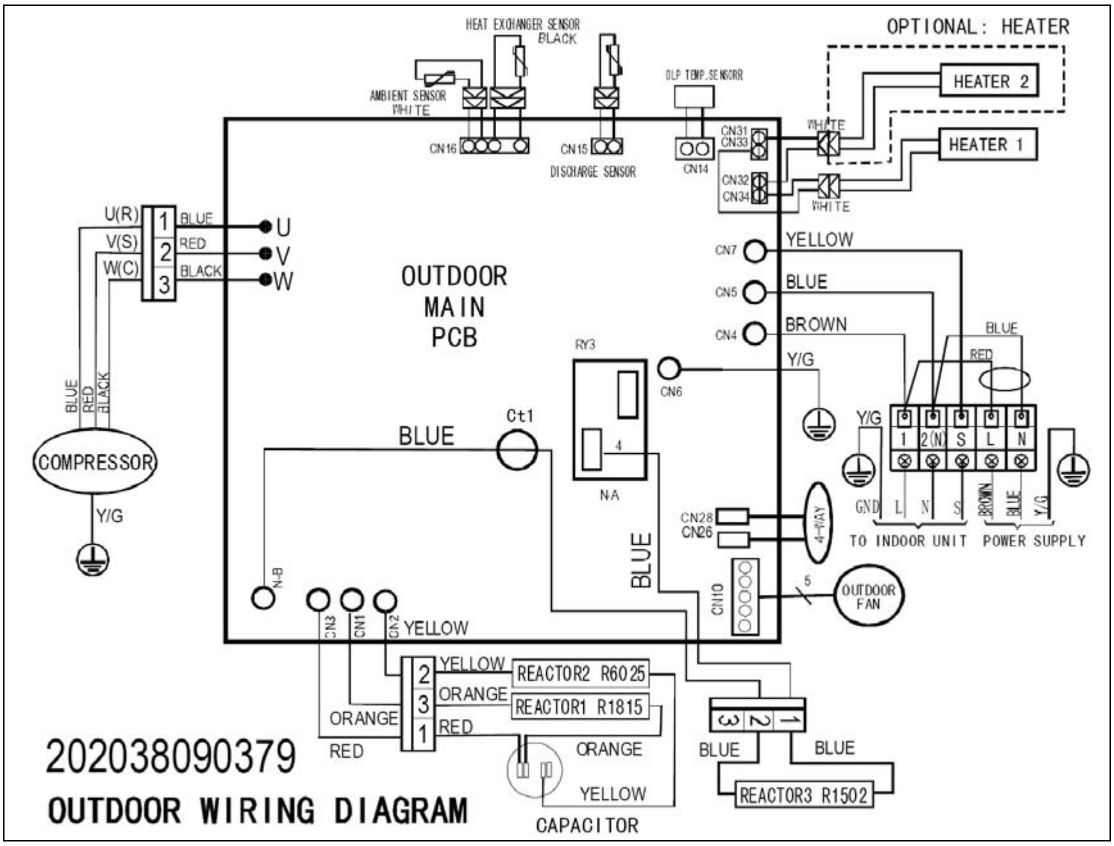
MOR-09HDN1-QC2   MOR-12HDN1-QC2



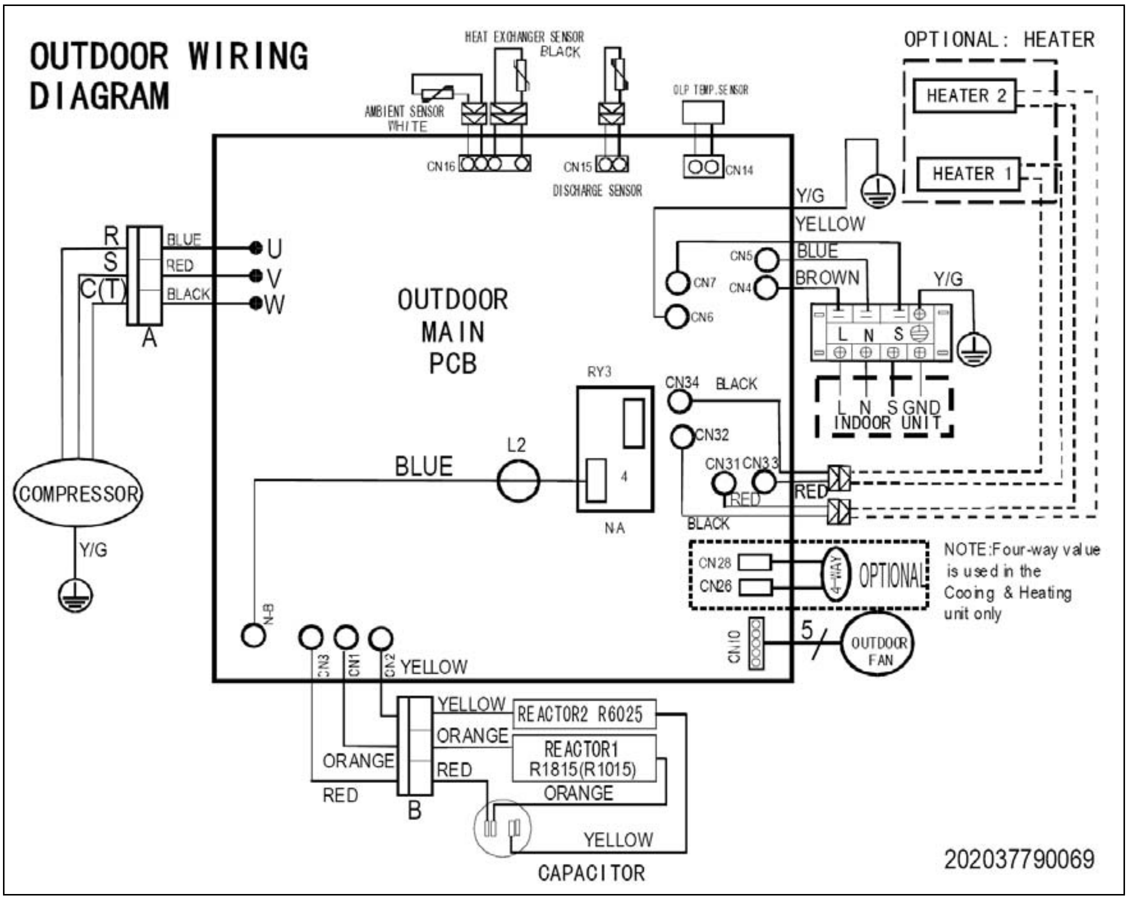
MOC2-18HDN1-QC2



MOF-24HDN1-QC2W

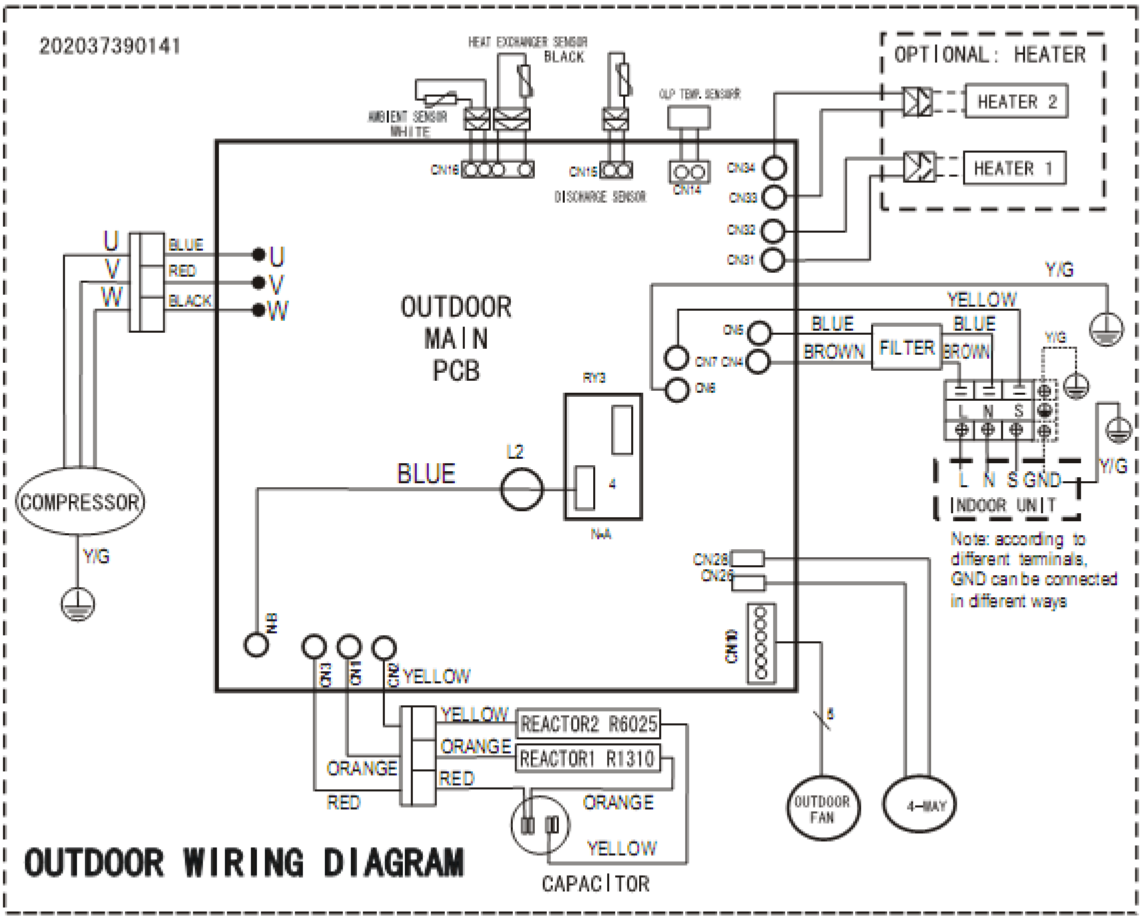


MOC2-18HDN1-QC2



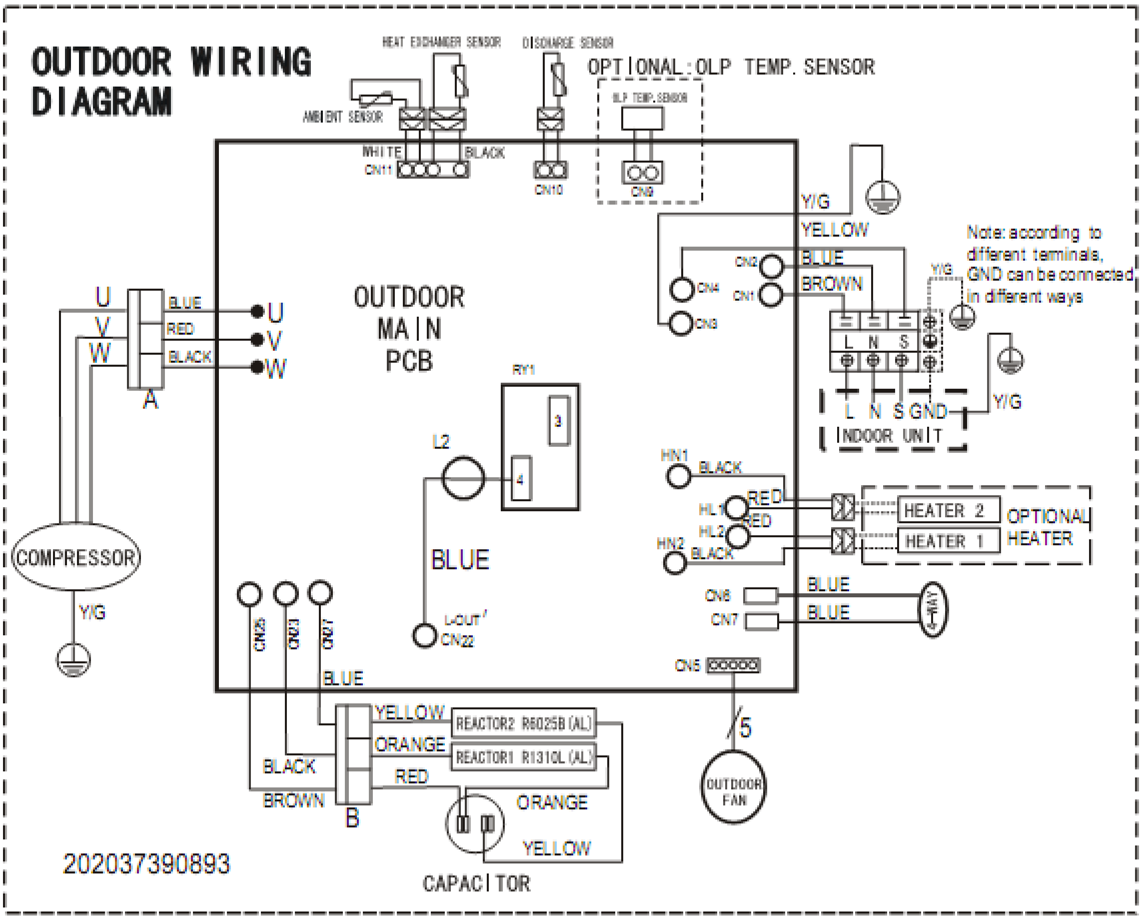
MOC-09HDN1-ND2E

MOC1-12HFN1-ND0E

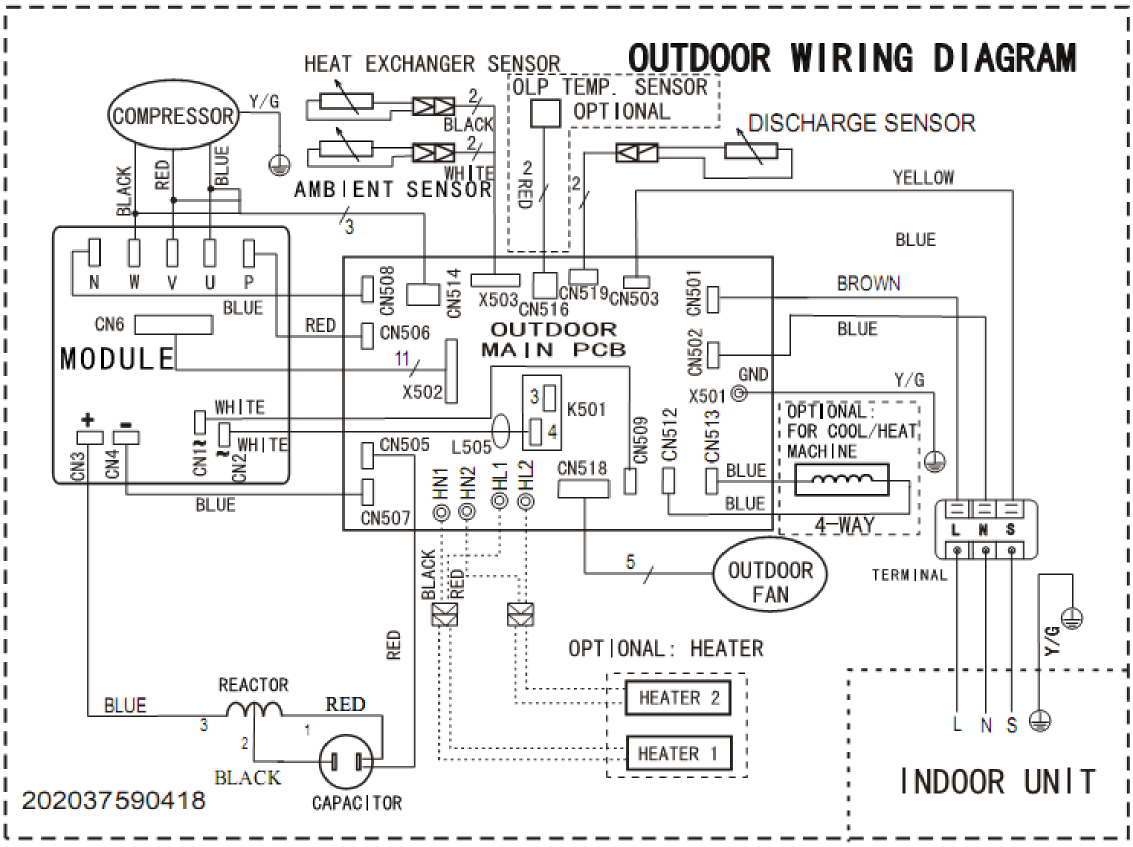


MOC-09HDN1-QC8

MOC-12HDN1-QC4



MOA-09HDN1-QC2　MOB4-12HDN1-QC2



6. Installation details

6.1 Wrench torque sheet for installation

Outside diameter		**Torque** N.cm	**Additional tightening torque** N.cm
mm	inch		
Φ6.35	1/4	1570 (160kgf.cm)	1960 (200kgf.cm)
Φ9.53	3/8	2940 (300kgf.cm)	3430 (350kgf.cm)
Φ12.7	1/2	4900 (500kgf.cm)	5390 (550kgf.cm)
Φ16	5/8	7360 (750kgf.cm)	7850 (750kgf.cm)

6.2 Connecting the cables

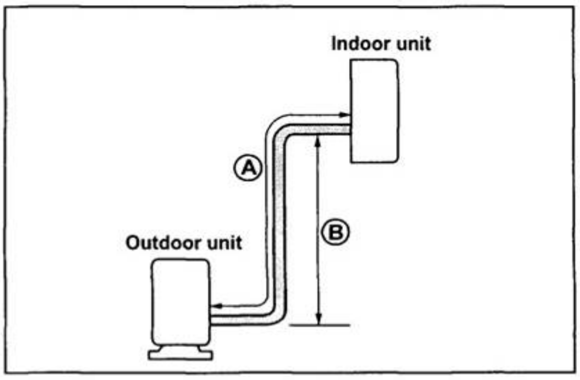
he power cord of connect should be selected according to the following specifications sheet.

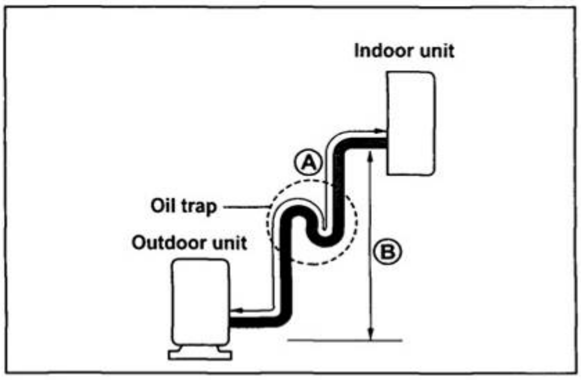
Rated current of appliance	**Nominal cross-sectional area (mm^2)**
>3 and ≤6	0.75
>6 and ≤10	1.0
>10 and ≤16	1.5
>16 and ≤25	2.5

The cable size and the current of the fuse or switch are determined by the maximum current indicated on the nameplate which located on the side panel of the unit. Please refer to the nameplate before selecting the cable, fuse and switch.

6.3 Pipe length and the elevation

Capacity Btu/h	Pipe size		Standard length (m)	Max. Elevation B (m)	Max. Length A (m)	Additional refrigerant (g/m)
	Gas	Liquid				
MSV1-09HRDN1-QC2 MSV1-12HRDN1-QC2 MSV1-09HRFN1-ND2E MSV1-09HRDN1-QC8 MSV1-09HRDN1-QC2(D)	4/8” (Φ6.35)	3/8” (Φ9.53)	5	8	20	20
MSV1-18HRDN1-QC2F(E) MSV1-18HRDN1-QC2FD	1/2” (Φ12.7)	4/8” (Φ6.35)	5	10	25	20
MSV1-12HRFN1-ND0E MSV1-12HRDN1-QC4 MSV1-12HRDN1-QC2(D)	1/2” (Φ12.7)	4/8” (Φ6.35)	5	8	20	20
MSV1-24HRDN1-QC2W	5/8” (Φ16)	3/8” (Φ9.53)	5	10	25	40





Caution:

Capacity test is based on standard length and maximum allowance length is based on reliability.

Oil trap should be installed per 5-7 meters.

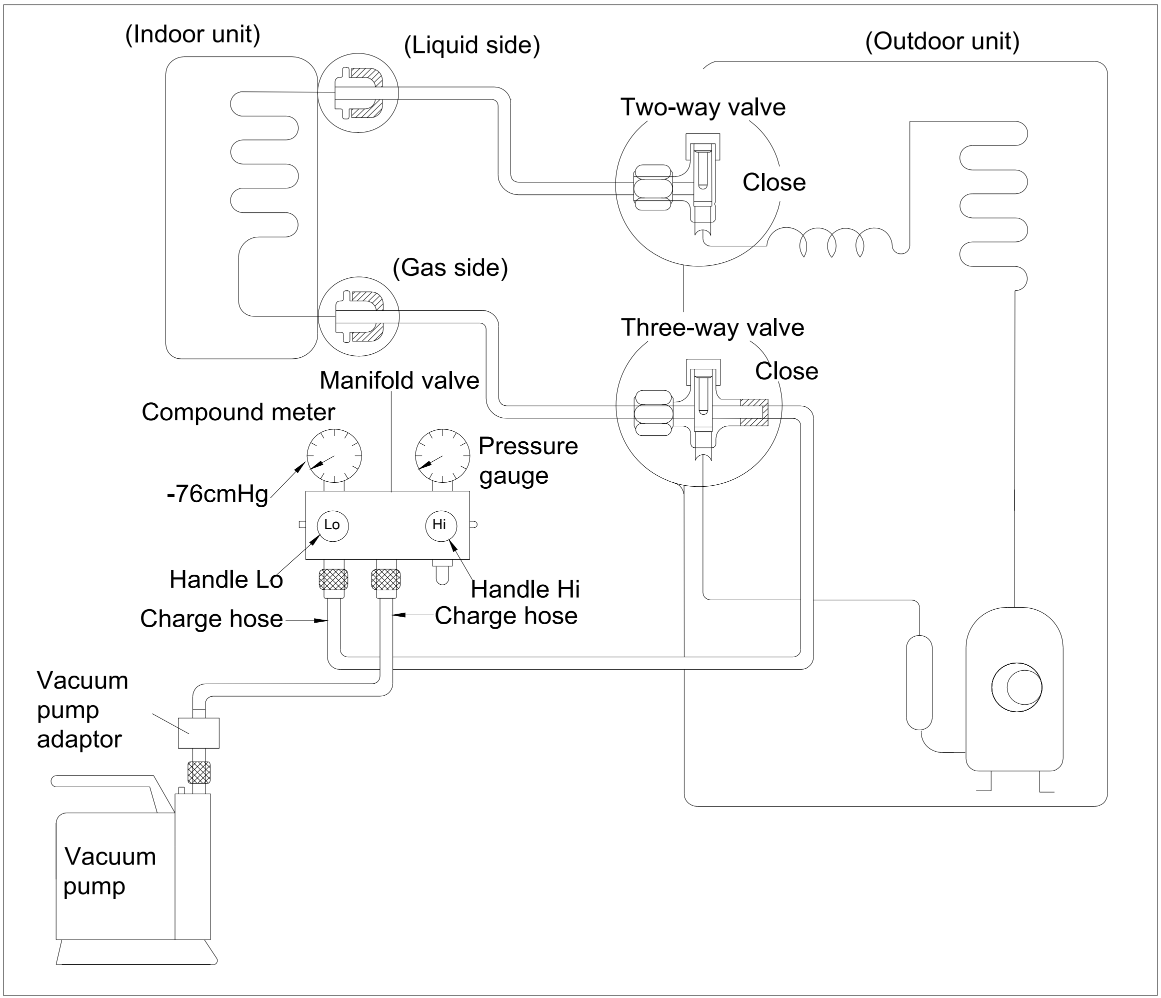
6.4 Air purging with vacuum pump

Air and moisture in the refrigerant system have undesirable effects as below:

- Pressure in the system rises.
- Operating current rises.
- Cooling or heating efficiency drops.
- Moisture in the refrigerant circuit may freeze and block capillary tubing.
- Water may lead to corrosion of parts in the refrigerant system.

Therefore, the indoor units and the pipes between indoor and outdoor units must be leak tested and evacuated to remove gas and moisture from the system.

Air purging with vacuum pump



Procedure

1. Completely tighten the flare nuts of the indoor and outdoor units, connect the manifold valve charge.
2. Connect the charge hose connection to the vacuum pump.
3. Fully open the handle Lo of the manifold valve.
4. Operate the vacuum pump to evacuate. After starting evacuation, slightly loose the flare nut of the Lo valve on the gas pipe side and check the air is entering. (Operation noise of the vacuum pump changes and a compound meter indicates 0 stead of minutes)
5. After the evacuation is complete, fully close the handle Lo valve of the manifold valve and stop the

operation of the vacuum pump. Make evacuation for 15 minutes or more and check the compound meter indicates -76cmHg.

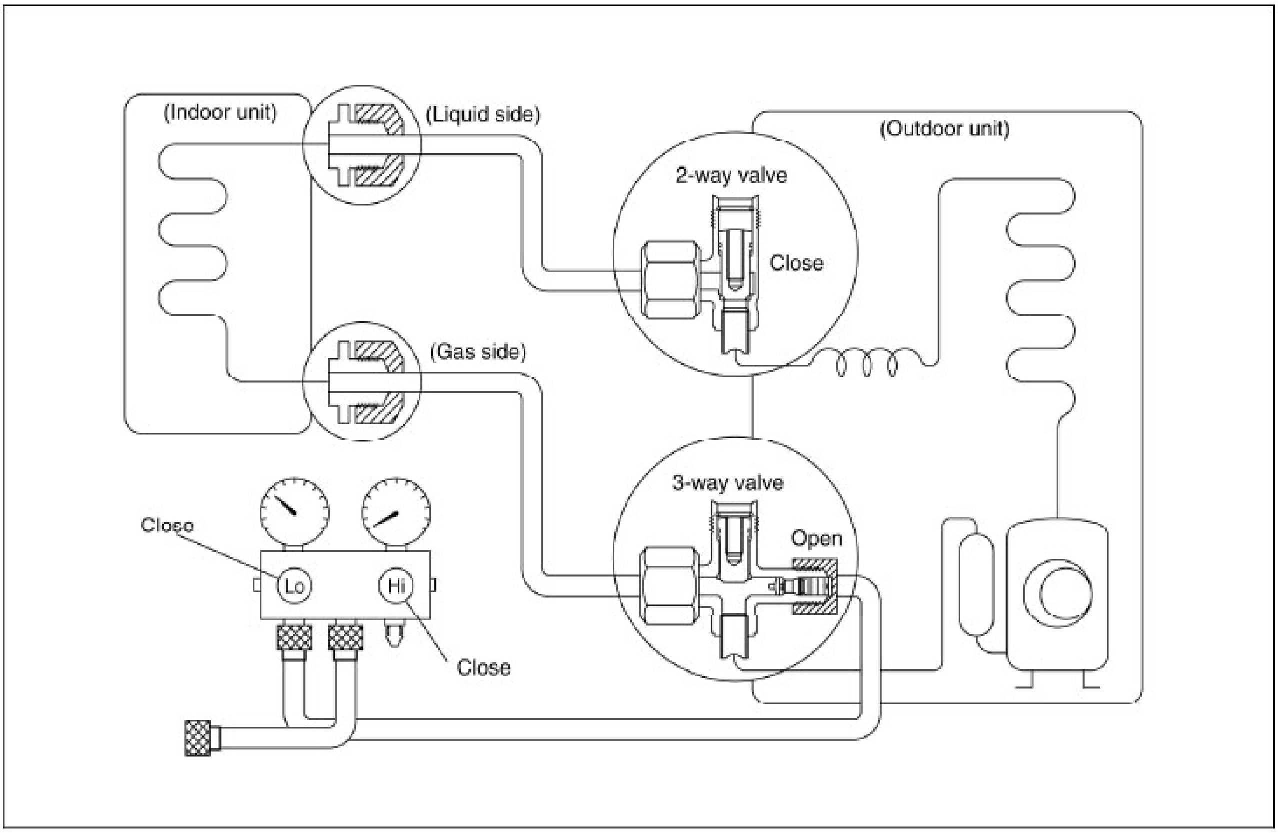
6. Turn the stem of the Hi valve about 45°counterclockwise for 6 or 7seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure.
7. Remove the charge hose from the Lo pressure charge hose.
8. Fully open the Hi and Lo packed valve.
9. Securely tighten the cap of the packed valve.

Gas leak check

Soap water method

Apply soap water or a liquid neutral detergent on the indoor unit connections or outdoor unit connections by a soft brush to check for leakage of the connecting points of the piping. If bubbles come out, the pipes have leakage.

6.5 Pumping down (Re-installation)



Procedure

1. Confirm that both the 2-way and 3-way valves are set to the opened position.

   Remove the valve stem caps and confirm that the valve stems are in the opened position.

   Be sure to use a hexagonal wrench to operate the valve stems.

2. Operate the unit for 10 to 15 minutes.

3. Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way

valve.

Connect the charge hose with the push pin to the gas service port.

5. Air purging of the charge hose.

Open the low-pressure valve on the charge set slightly to purge air from the charge hose.

6. Set the 2-way valve to the close position.

7. Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1MPa.

8. Immediately set the 3-way valve to the closed position.

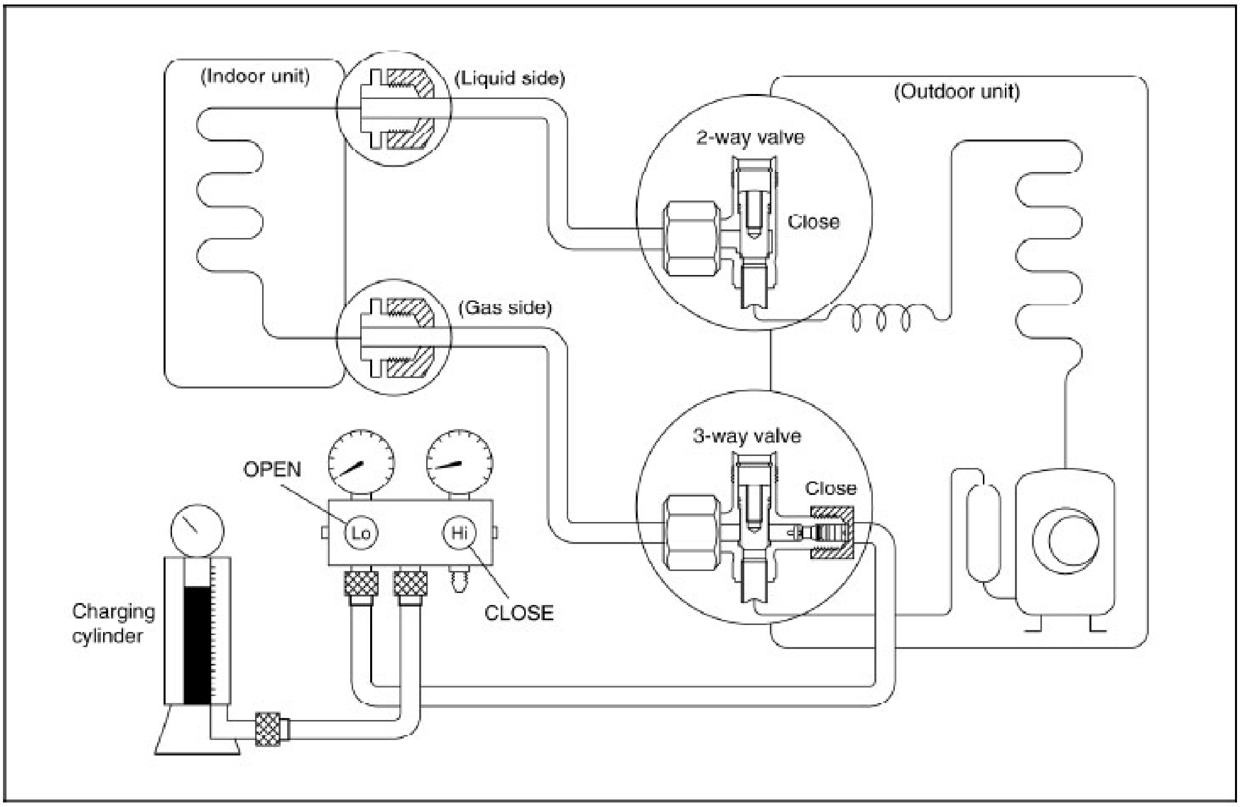
Do this quickly so that the gauge ends up indicating 0.3 to 0.5Mpa.

Disconnect the charge set, and amount the 2-way and 3-way valve’s stem nuts and service port caps.

Use a torque wrench to tighten the service port cap.

Be sure to check for gas leakage.

6.6 Re-air purging (Re-installation)



Procedure:

1. Confirm that both the 2-way and 3-way valves are set to the closed position.

2. Connect the charge set and a charging cylinder to the service port of the 3-way valve.

Leave the valve on the charging cylinder closed.

3. Air purging.

Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45' for 3 seconds then closing it for 1 minute; repeat 3 times.

After purging the air, use a torque wrench to tighten the flare nut to on the 2-way valve.

4. Check the gas leakage.

Check the flare connections for gas leakage.

5. Discharge the refrigerant.

Close the valve on the charging cylinder and discharge the refrigerant until the gauge indicates 0.3 to 0.5 Mpa.

6. Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position.

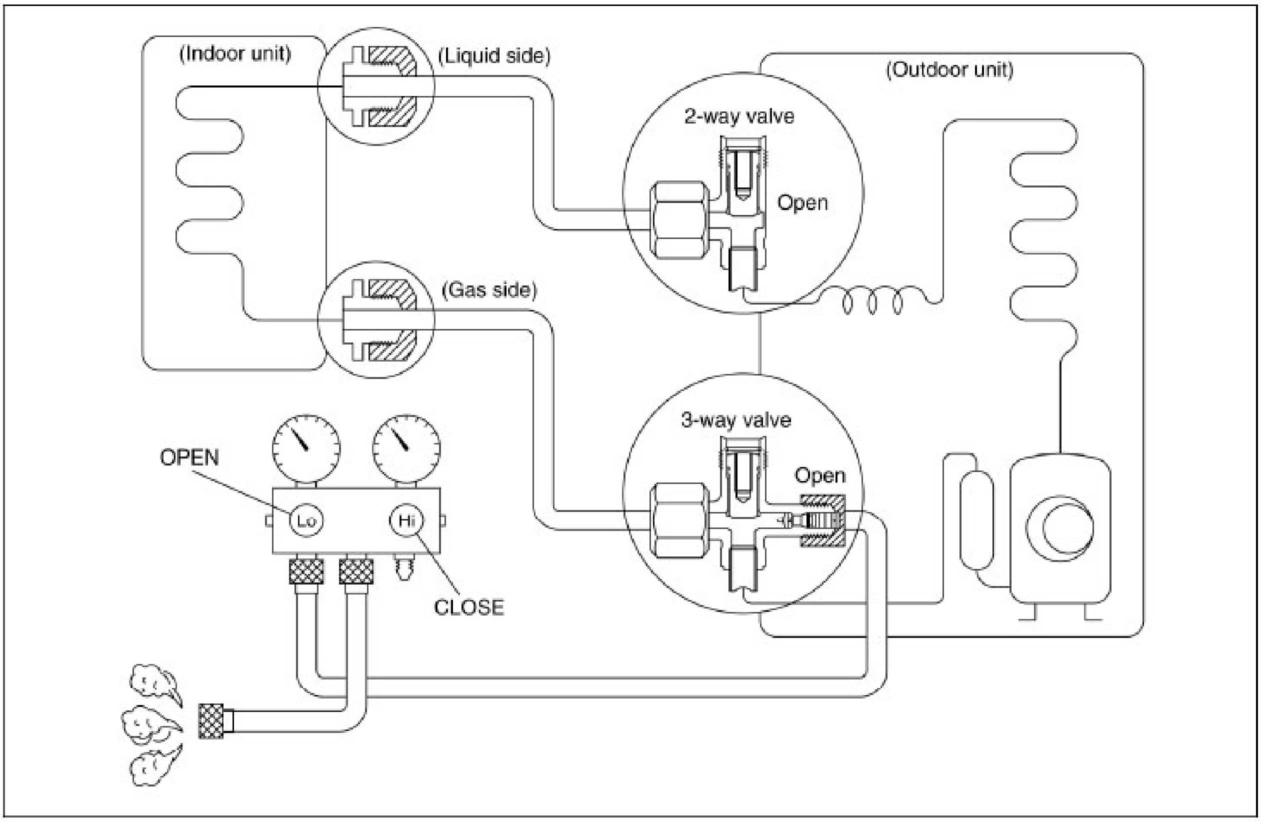
Be sure to use a hexagonal wrench to operate the valve stems.

7. Mount the valve stems nuts and the service port cap.

Be sure to use a torque wrench to tighten the service port cap.

Be sure to check the gas leakage.

6.7 Balance refrigerant of the 2-way, 3-way valves



Procedure:

1. Confirm that both the 2-way and 3-way valves are set to the open position.

2. Connect the charge set to the 3-way valve's service port.

Leave the valve on the charge set closed.

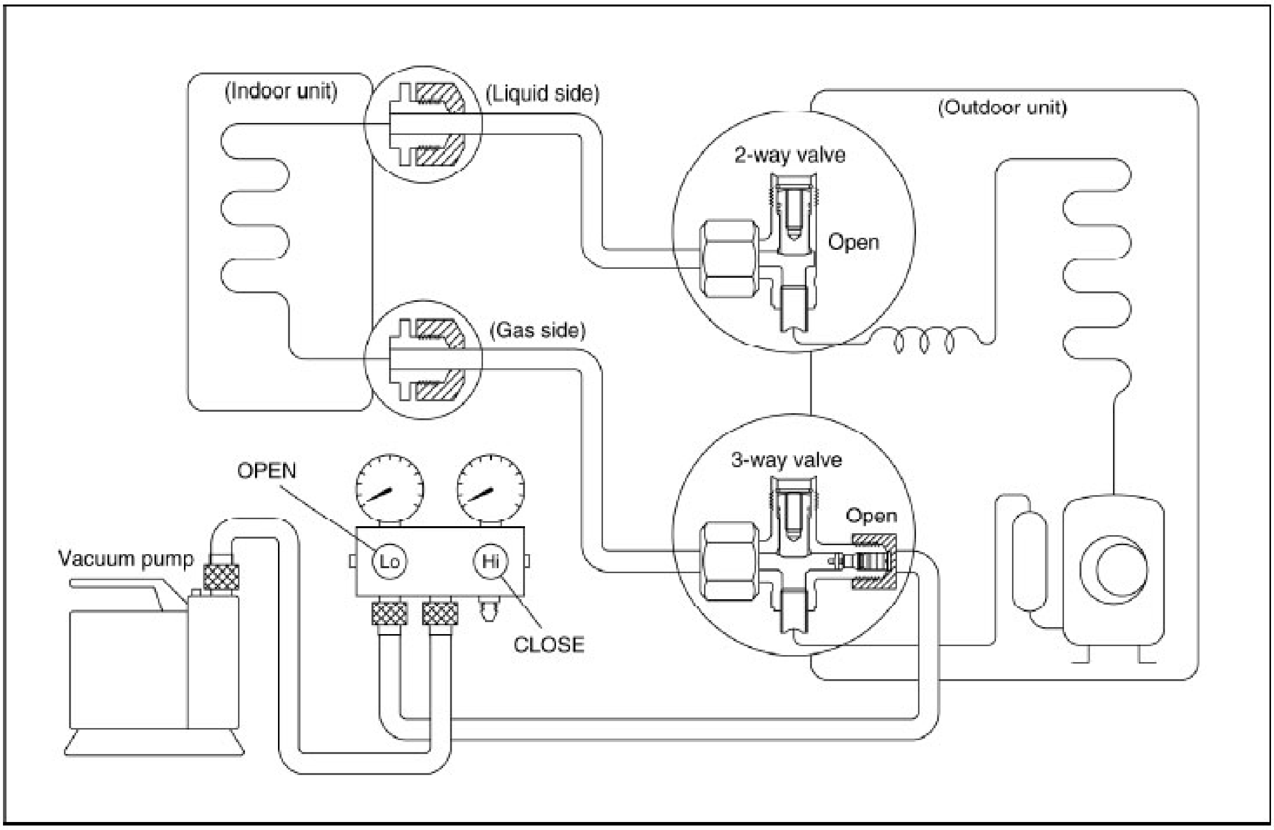
Connect the charge hose with the push pin to the service port.

3. Open the valves (Low side) on the charge set and discharge the refrigerant until the gauge indicates 0.05 to 0.1Mpa.

If there is no air in the refrigeration cycle, it will not be necessary to apply an evacuation.

Discharge the refrigeration gradually; if it is discharged too suddenly, the refrigeration oil will be discharged.

6.8 Evacuation



Procedure:

1. Connect the vacuum pump to the charge set's centre hose.

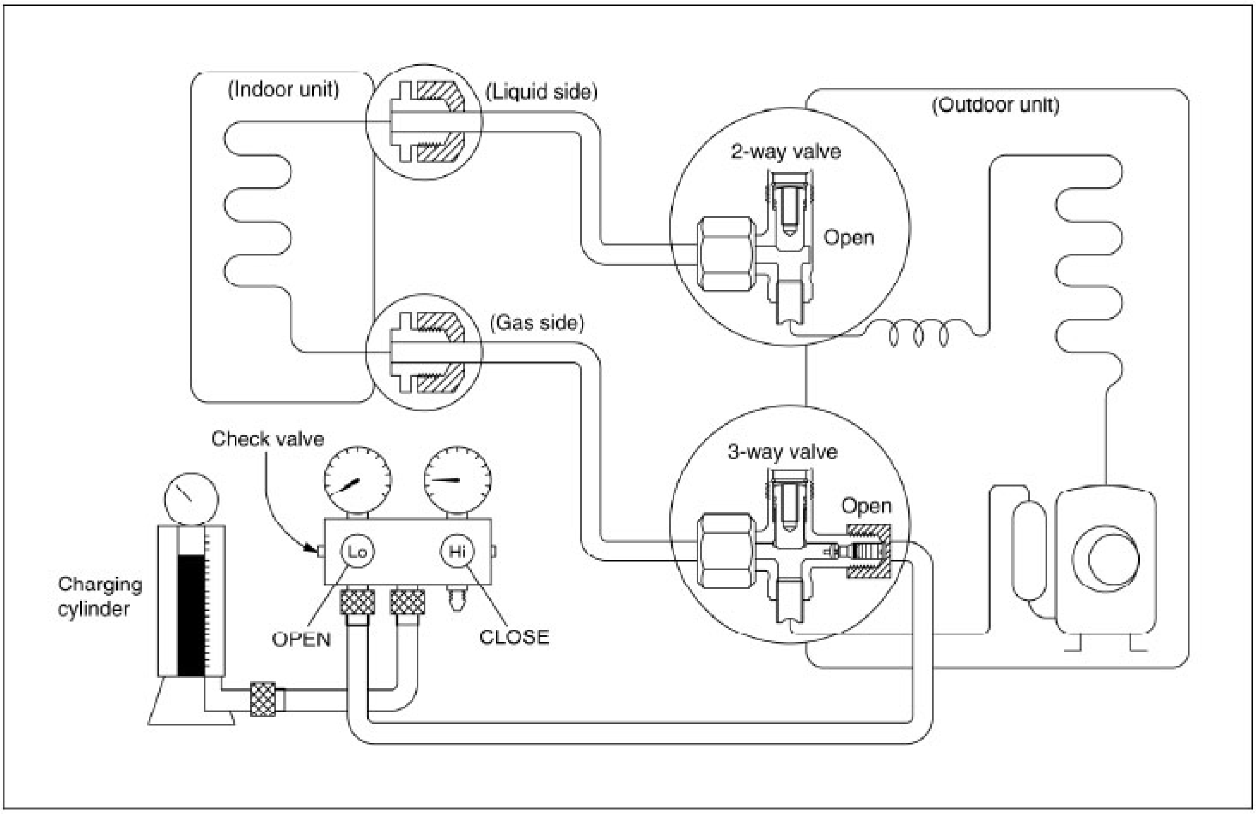
2. Evacuation for approximately one hour.

Confirm that the gauge needle has moved toward -0.1 Mpa (-76 cmHg) [vacuum of 4 mmHg or less].

3. Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

4. Disconnect the charge hose from the vacuum pump.

6.9 Gas charging



Procedure:

1. Connect the charge hose to the charging cylinder.

Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

2. Purge the air from the charge hose.

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

3. Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.

4. Immediately disconnect the charge hose from the 3-way valve’s service port.

Stopping partway will allow the refrigerant to be discharged.

If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.

5. Mounted the valve stem caps and the service port

Use torque wrench to tighten the service port cap.

Be sure to check for gas leakage.

7. Operation characteristics

Mode Temperature	Cooling operation	Heating operation	Dehumidify operation
Room temperature	≥17□	≤ 30□	＞10℃
Outdoor temperature	0℃~50℃	-15℃~34℃	0℃~ 50℃

CAUTION:

1. If air conditioner is used beyond the above conditions, the certain protections may action.

2. Room relative humidity should be less than 80%. If the air conditioner operates in excess of this value, the surface of the air conditioner may attract condensation. In this case, please set the vertical air louver to its maximum angle (vertically to the floor), and set the fan to high speed.

8. Electronic function

8.1 Abbreviation

T1: Indoor ambient temperature

T2: Pipe temperature of indoor heat exchanger

T3: Pipe temperature of outdoor heat exchanger

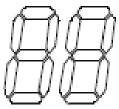
T4: Outdoor ambient temperature

T5： Discharge temperature

8.2 Display function

8.2.1 Icon explanation on indoor display board.



	TIMER display Illuminated during Timer operation.
	CLEAN AIR display(optional) Illuminated when Ionizer is activated.
	TURBO operation display Illuminated when select TURBO function in cooling operation or in heating operation.
	DIGITAL DISPLAY Displayed the current setting temperature or malfunction code when the air conditioner is in operation. When SELF CLEAN feature is activated, it displays . “SC”
	FAN SPEED display Displayed the selected fan speed: LOW( ), MED( ) and HIGH( ).
	Operation Frequency display This display is separated into five zones. The zones illuminate based on the compressor current frequency. For example, higher frequency will illuminate more zones.

8.3 Main Protection

8.3.1 Three Minutes Delay at restart for compressor.

---- 1min delay for the 1st time start-up and 3 minutes delay for others.

8.3.2 Temperature protection of compressor top.

---- Top temp. protector cut off for 30s and restart the compressor with 3 minutes delay.

8.3.3 Temperature protection of compressor discharge.

When the compressor discharge temp. is getting higher, the running frequency will be limited as below rules:

----Compressor discharge temp. T5>115℃ for 5s, compressor stops.

---- 108<T5<115℃, decrease the frequency to the lower level every 3 minutes.

---90<T5<105℃, keep running as the current frequency.

----T5<90℃, cancel the frequency limit control or restart compressor

8.3.4 Fan Speed is out of control.

---- When indoor fan speed is lower than 300RPM for 50 second, the whole unit stops and LED displays failure, and the error can't resume automatically.

8.3.5 Inverter module Protection.

----Inverter module protection itself has a protection function against current, voltage and temperature. If these protections happened, the corresponding code will display on indoor unit LED and A/C will stop. The unit will recover 3min delay after the protection disappeared.

8.3.6 Indoor fan delayed open function

----When the system starts up, the louver will be active immediately and the indoor fan will open 10s later.

----If the system runs in heating mode, the anti-cold wind function has priority.

8.3.7 Compressor preheating functions.

----Preheating permitting condition:

If the main relay closed, T4＜3℃ and the machine is first power on, or T4＜3℃ and compressor has stopped over 3 hours, the compressor heating cable will work.

----Preheating mode:

A weak current flows through the coil of compressor from the wiring terminal of compressor, then the compressor is heated without operation.

----Preheating release condition:

If T4＞5□ or user turns on the machine and compressor runs, preheating function will stop.

---- Crankcase Heater

It starts when T4<5□ and stops when T4>15□

8.4 Operation Modes and Functions

8.4.1 Fan only mode.

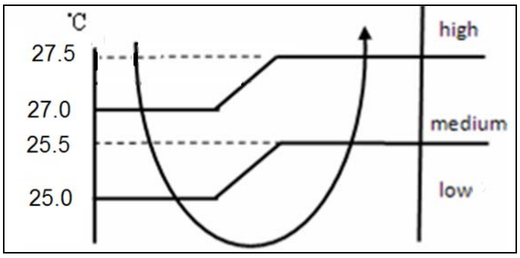
(1) Outdoor fan and compressor stop.

(2) Temperature setting function is disabled, and no setting temperature is displayed.

(3) Indoor fan can be set to high/med/low/auto.

(4) The louver operates same as in cooling mode.

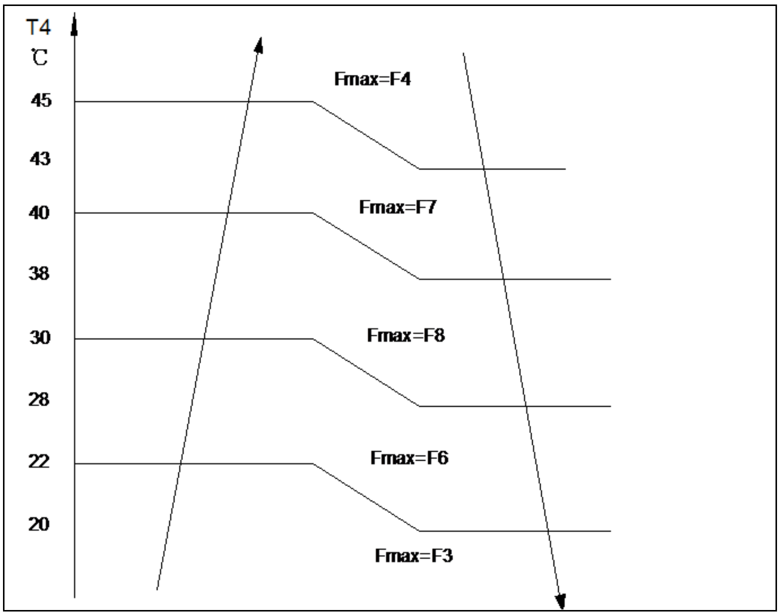
(5) The action of auto fan in fan-only mode is the same as auto fan in cooling mode with 24□ setting temperature.



8.4.2 Cooling Mode

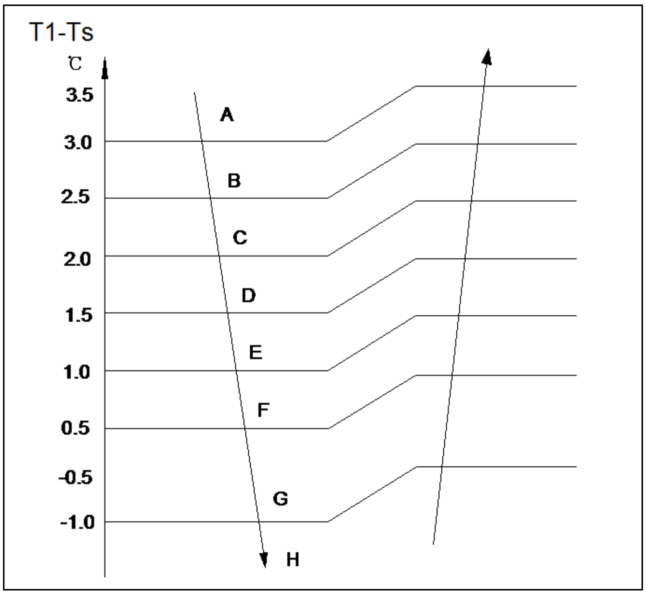
8.4.2.1 Compressor running rules:

The operation frequency of compressor after starting submits to following rule.



If users switch on A/C by remote controller, the compressor will run at the Fmax frequency for 7 minutes according to outdoor ambient temp. During the 7 minutes, frequency limitation is active.

7 minutes later, the compressor running frequency will be controlled as below:



While

Temp.zone	A	B	C	D	E	F	G
Frequency	F8	F8	F7	F6	F5	F3	F1

Note:

When T1-Ts keeps in the same temp. zone for 3 minutes, the compressor will run as the below rules:

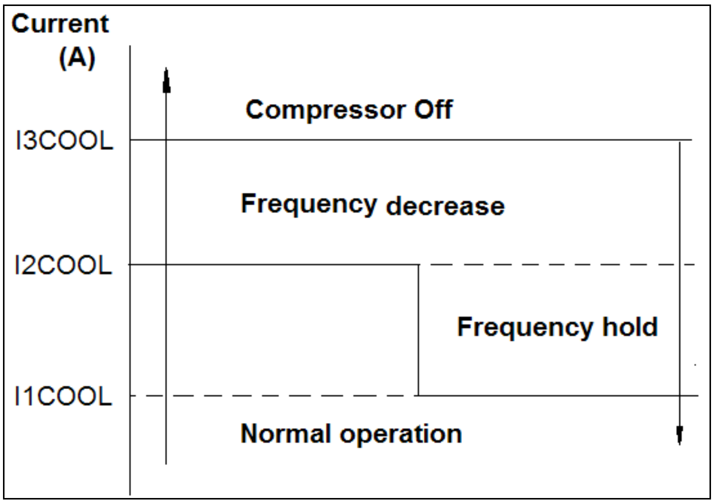
A~E: Increase the frequency to the higher level until to F8.

F: Keep the current frequency.

G: Decrease the frequency to the lower level until to F1.

H: Run at F1 for 1h.(if T1-Ts<-2□, compressor will stop)

Meanwhile, the compressor running frequency is limited by the current.



If the current increased more than I2COOL, the frequency will decrease automatically, if the current raise to over I3COOL, the compressor will stop and restart 3min later.

During the frequency decreasing, if the current deceased to between I1COOL and I2COOL, the frequency will hold. If the frequency not changed for 3min, the frequency will increase to a higher level, and it can increase twice at most.

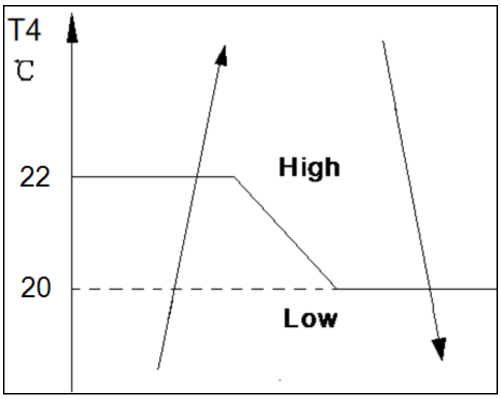
If the current deceased to lower than I1COOL, the frequency limit will be invalid.

Model	Current		
	I1COOL	I2COOL	I3COOL
MSV1-09HRDN1-QC2+ MOR-09HDN1-QC2	4.5	5.5	6.5
MSV1-12HRDN1-QC2+MOR-12HDN1-QC2	5.5	6.5	7.5
MSV1-18HRDN1-QC2F(D)+ MOC2-18HDN1-QC2 MSV1-18HRDN1-QC2F(E)+ MOC2-18HDN1-QC2	9	10	11
MSV1-24HRDN1-QC2W+MOF-24HDN1-QC2W	11	12	13
MSV1-09HRFN1-ND2E+ MOC-09HDN1-ND2E MSV1-12HRFN1-ND0E+ MOC1-12HFN1-ND0E	5.2	6.4	7.5
MSV1-12HRDN1-QC4+ MOC-12HDN1-QC4	5.6	6.8	7.9
MSV1-09HRDN1-QC8+ MOC-09HDN1-QC8	4.9	5.9	6.9
MSV1-09HRDN1-QC2(D)+ MOA-09HDN1-QC2	4.9	5.9	6.7
MSV1-12HRDN1-QC2(D)+ MOB4-12HDN1-QC2	5.6	6.8	7.9

8.4.2.2 Outdoor fan running rules:

Outdoor fan and compressor start up at the same time, outdoor fan stop 30s delay after the compressor stopped.

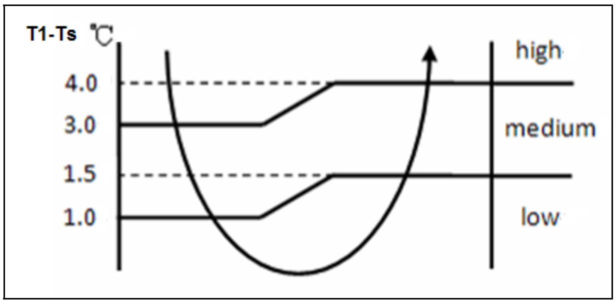
The outdoor fan have two speeds, it’s controlled by T4 as following rules:



8.4.2.3 Indoor fan running rules

In cooling mode, indoor fan runs all the time and the speed can be selected as high, medium, low and auto.

Auto fan in cooling mode acts as follow:



8.4.2.4 Condenser high temperature T3 protection.

When 55□<T3<60□, the compressor frequency will decrease to the lower level every 3 min until to F1 and then run at F1.

When T3<54□, the compressor will keep running at the current frequency.

When T3<52□, the compressor will not limit the frequency again and resume to the former frequency.

When T3>60□ for 5 seconds, the compressor will stop and restart until T3<52□.

8.4.2.5 Evaporator low temperature T2 protection.

When T2<0□, the compressor will stop and restart when T2>5□.

When 0□≤T2<4□, the compressor frequency will limited and decrease to the lower level every minute until stop the compressor.

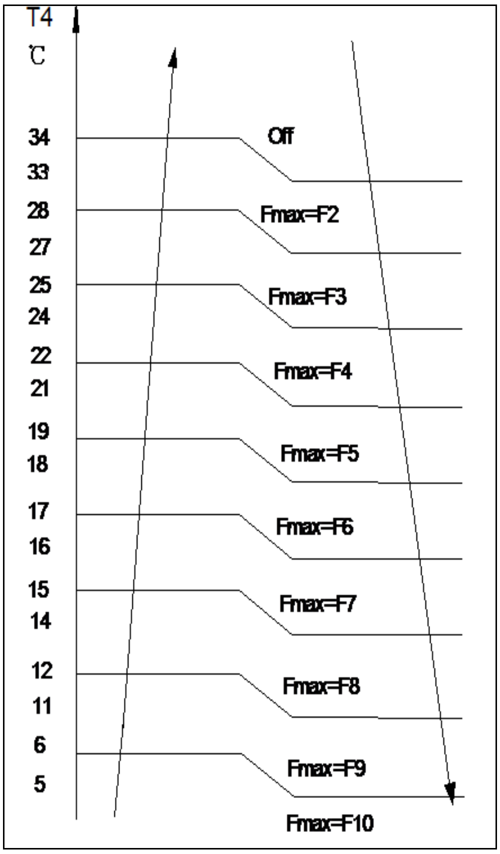
When 4□≤T2≤7□, the compressor will keep the current frequency.

When T2>7□, the compressor frequency will not be limited.

8.4.3 Heating Mode

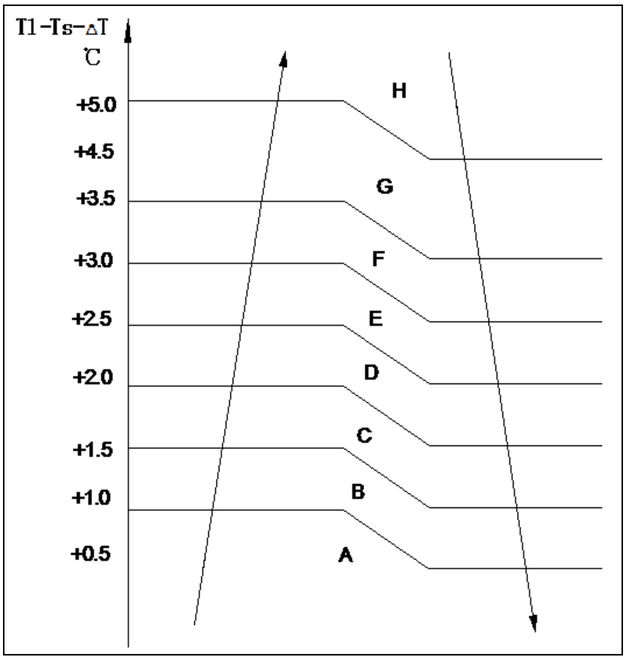
8.4.3.1 Compressor running rules:

The operation frequency of compressor after starting submits to following rule.



After A/C starts up, the compressor will run at the Fmax frequency for 7 minutes according to outdoor ambient temp. During the 7 minutes, frequency limitation is active.

7 minutes later, compressor running frequency will be controlled as below:



While

Temp. zone	A	B	C	D	E	F	G
Frequency	F10	F9	F8	F7	F5	F3	F1

ΔT=0□ as default.

Note:

When T1-Ts keeps in the same temp. zone for 3 minutes, the compressor will run as the below rules:

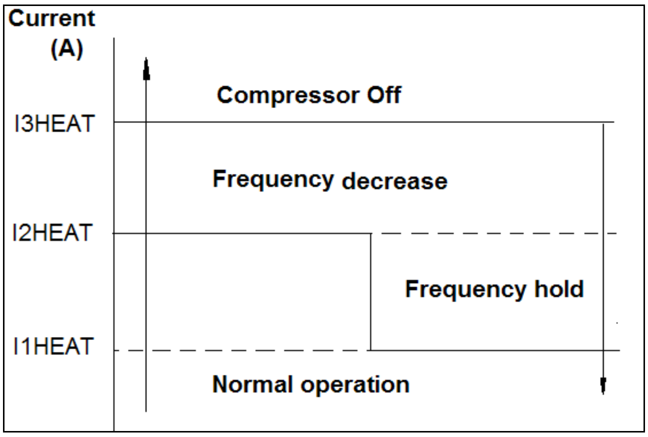
A~E: Increase the frequency to the higher level until to F10.

F: Keep the current frequency.

G: Decrease the frequency to the lower level until to F1.

H: Run at F1 for 1h. (If T1-Ts-ΔT >6□, compressor will stop)

Meanwhile, the compressor running frequency is limited by the current.



If the current increased more than I2HEAT, the frequency will decrease automatically, if the current raise to over I3HEAT,, the compressor will stop and restart 3min later.

During the frequency decreasing, if the current deceased to between I1HEAT, and I3HEAT,, the frequency will hold. If the frequency not changed for 3min, the frequency will increase to a higher level, and it can increase twice at most.

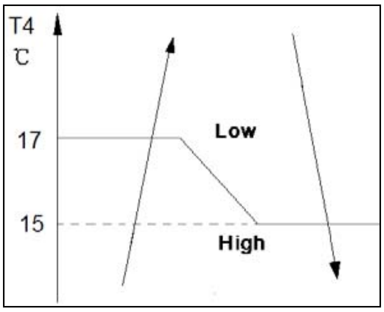
If the current deceased to lower than I1HEAT, the frequency limit will be invalid.

Model	Current		
	I1HEAT	**I2HEAT**	**I3HEAT**
MSV1-09HRDN1-QC2+ MOR-09HDN1-QC2	5.0	6.0	7.0
MSV1-12HRDN1-QC2+MOR-12HDN1-QC2	6.0	7.0	8.0
MSV1-18HRDN1-QC2F(D)+ MOC2-18HDN1-QC2 MSV1-18HRDN1-QC2F(E)+ MOC2-18HDN1-QC2	9	10	11
MSV1-24HRDN1-QC2W+MOF-24HDN1-QC2W	11	12	13
MSV1-09HRFN1-ND2E+ MOC-09HDN1-ND2E MSV1-12HRFN1-ND0E+ MOC1-12HFN1-ND0E	5.2	6.4	7.5
MSV1-09HRDN1-QC8+ MOC-09HDN1-QC8 MSV1-12HRDN1-QC4+ MOC-12HDN1-QC4 MSV1-12HRDN1-QC2(D)+ MOB4-12HDN1-QC2	5.6	6.8	7.9
MSV1-09HRDN1-QC2(D)+ MOA-09HDN1-QC2	5.4	6.4	6.9

8.4.3.2 Outdoor fan running rules:

Outdoor fan and compressor start up at the same time, outdoor fan stop 30s delay after the compressor stopped.

The outdoor fan have two speeds, it’s controlled by T4 as following rules:



8.4.3.3 Indoor fan running rules:

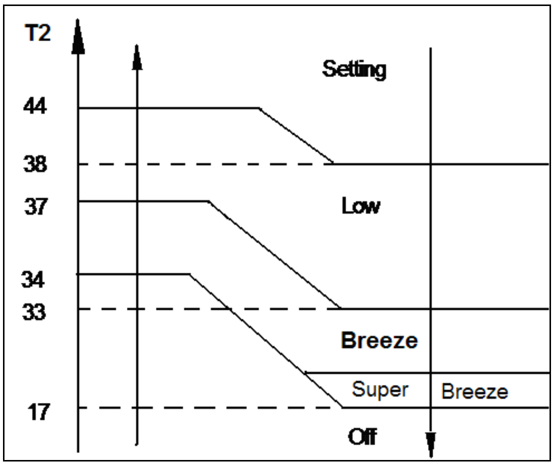
The indoor fan speed can be selected as high, medium, low and auto, the anti-cold-wind function has the priory.

If reached the set temperature, the indoor fan transfers to lowest speed, the anti-cold wind function has the priory.

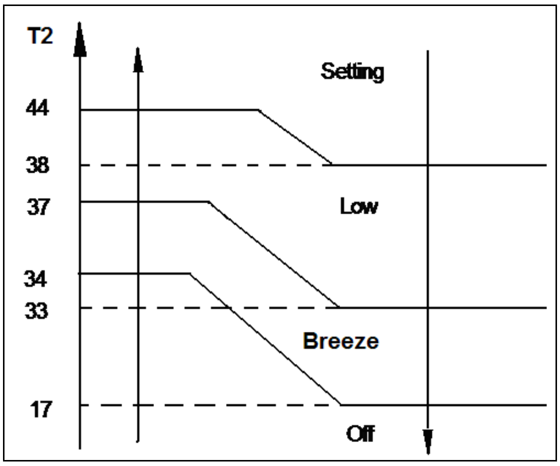
If operation mode transferred or compressor restarted, indoor fan works in setting fan speed.

Anti-cold-wind function control principle:

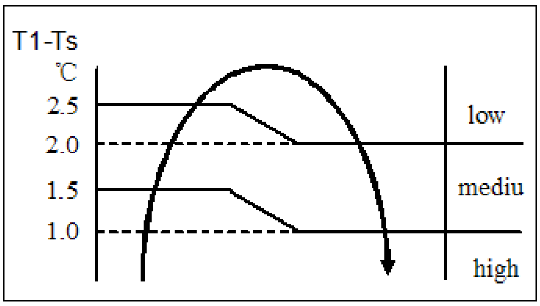
For 9K,12K,18K units



For 24K unit



Auto fan action in heating mode.



8.4.3.4 Defrosting mode:

Conditions of defrosting:

Condition 1: If T4＞0□,

When the units are running, if any one of the following conditions is satisfied, the unit starts defrosting:

① If the accumulated time of the unit working within T3＜3□reached 40 minutes and T3 keeps lower than -6□ over 3 minutes.

② If the accumulated time of the unit working within T3＜3□reached 80 minutes and T3 keeps lower

than -4□ over 3 minutes.

Condition 2: If T4＜0□,

If satisfied any item of the condition 1 and the T2 temperature has decreased 5□, starts defrosting.

Note: T2 is the maximum value of the evaporator temperature during the anti-cold wind function. It's recorded by the system automatically.

Condition 3:

No matter what value T4 is, if the accumulated time of the unit working within T3＜3□reached 120 minutes and T3 keeps lower than -2□ over 3 minutes, starts defrosting.

Condition of ending defrosting:

If any one of following items is satisfied, defrosting will stop and the machine will turn to normal heating mode.

① T3 >TCDE1□.

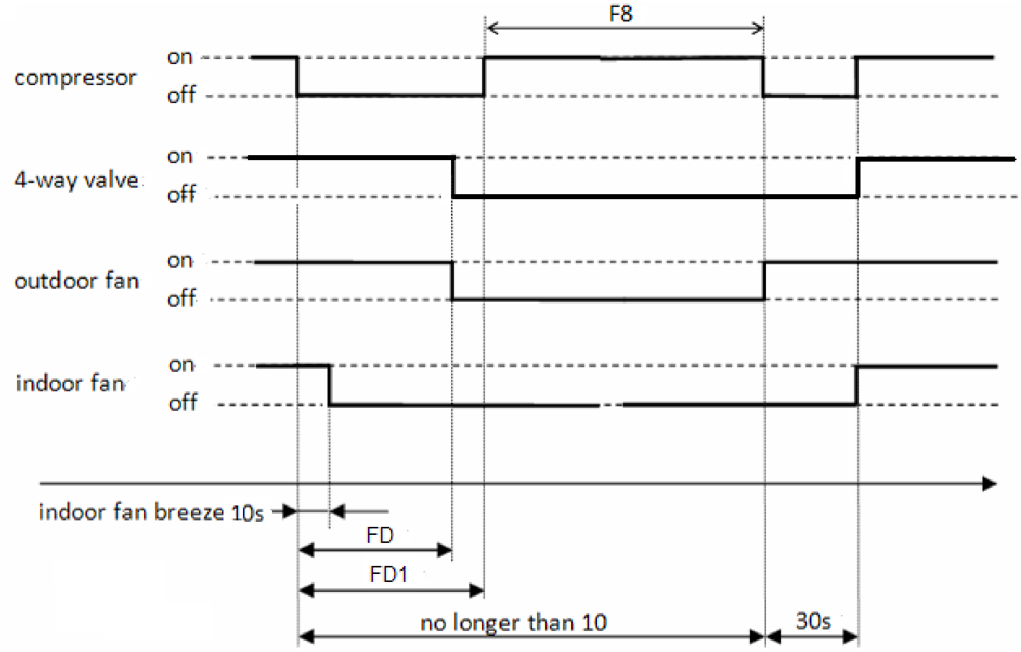
Model	TCDE1 （℃）
MSV1-09HRDN1-QC2+ MOR-09HDN1-QC2	12
MSV1-12HRDN1-QC2+MOR-12HDN1-QC2	
MSV1-09HRFN1-ND2E+ MOC-09HDN1-ND2E	
MSV1-12HRFN1-ND0E+ MOC1-12HFN1-ND0E	
MSV1-09HRDN1-QC8+ MOC-09HDN1-QC8	
MSV1-12HRDN1-QC4+ MSV1-12HRDN1-QC4	
MSV1-09HRDN1-QC2(D)+ MOA-09HDN1-QC2	
MSV1-12HRDN1-QC2(D)+ MOB4-12HDN1-QC2	
MSV1-18HRDN1-QC2F(D)+ MOC2-18HDN1-QC2	15
MSV1-18HRDN1-QC2F(E)+ MOC2-18HDN1-QC2	
MSV1-24HRDN1-QC2W+MOF-24HDN1-QC2W	12

② T3>8□ and remains for 80 seconds.

③ The defrosting time lasts 10min.

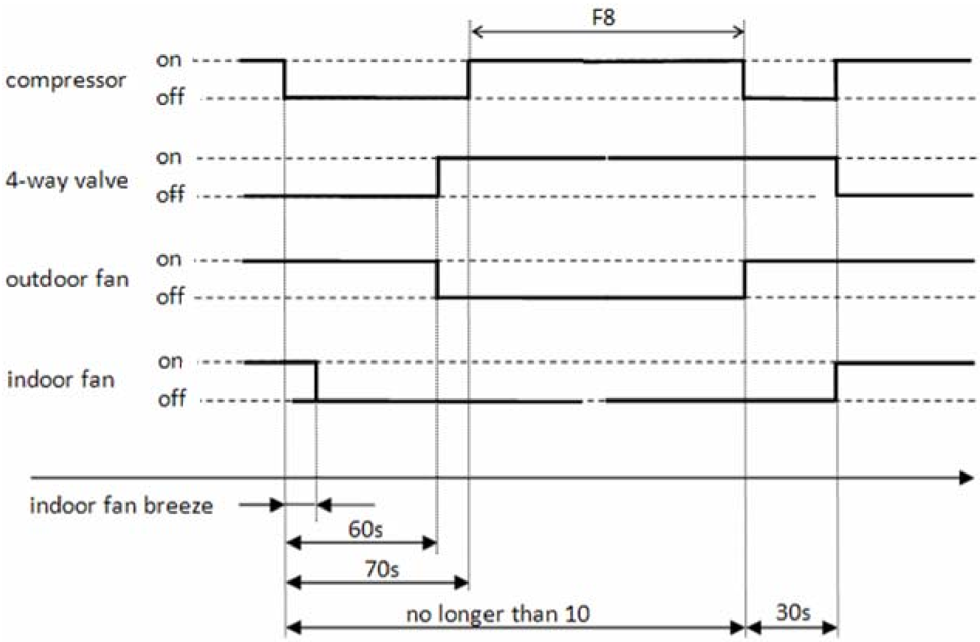
Defrosting action：

For MSV1-24HRDN1-QC2W, MSV1-18HRDN1-QC2FD, MSV1-18HRDN1-QC2F(E)



Model	FD	FD1
MSV1-18HRDN1-QC2F(D)+MOC2-18HDN1-QC2	60	70
MSV1-18HRDN1-QC2F(E)+ MOC2-18HDN1-QC2		
MSV1-24HRDN1-QC2W+MOF-24HDN1-QC2W	90	100

For MSV1-09HRDN1-QC2, MSV1-12HRDN1-QC2, MSV1-09HRFN1-ND2E, MSV1-12HRFN1-ND0E, MSV1-09HRDN1-QC8, MSV1-12HRDN1-QC4, MSV1-09HRDN1-QC2(D), MSV1-12HRDN1-QC2(D)



8.4.3.5 High evaporator coil temp.T2 protection:

(1) T2> TEH2, compressor running frequency decreases to the lower level every 20s. If the frequency decreased to F2 and the T2 still over TEH2 for 3 minutes, the compressor will stop. If T2 deceased to lower than 48□, or 48□<T2< TEH2 last for 6 minutes, release the frequency limit control.

(2) If T2>60□, stop the compressor and restarts until T2<48□.

Model	TEH2（℃）
MSV1-09HRDN1-QC2+ MOR-09HDN1-QC2	53
MSV1-12HRDN1-QC2+MOR-12HDN1-QC2	
MSV1-18HRDN1-QC2F(D)+MOC2-18HDN1-QC2	
MSV1-18HRDN1-QC2F(E)+ MOC2-18HDN1-QC2	
MSV1-09HRFN1-ND2E+MOC-09HDN1-ND2E	
MSV1-12HRFN1-ND0E+ MOC1-12HFN1-ND0E	
MSV1-09HRDN1-QC8+MOC-09HDN1-QC8	
MSV1-12HRDN1-QC4+ MOC-12HDN1-QC4	
MSV1-09HRDN1-QC2(D)+ MOA-09HDN1-QC2	
MSV1-12HRDN1-QC2(D)+ MOB4-12HDN1-QC2	
MSV1-24HRDN1-QC2W+MOF-24HDN1-QC2W	55

8.4.4 Auto-mode

This mode can be chosen by remote controller and the setting temperature can be changed between 17~30□.

In auto mode, the machine will choose cooling, heating or fan-only mode according to the difference between T1 and Ts.

T1-Ts	Running mode
T1-Ts＞1□	Cooling
-1< T1-Ts≤1□	Fan-only
T1-Ts≤-1□	Heating

Indoor fan will run in auto fan of the relevant mode.

The louver operates the same as in relevant mode.

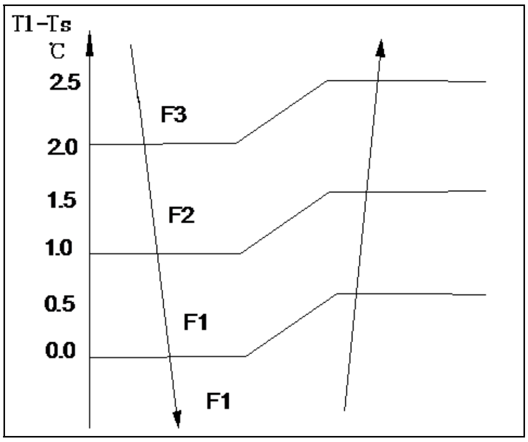
If the machine switches mode between heating and cooling, the compressor will keep stopping for 15 minutes and then choose the mode according to T1-Ts again.

If the setting temperature is modified, the machine will choose the running function again.

8.4.5 Dehumidify mode

8.4.5.1 Indoor fan speed is fixed in breeze and can't be changed. The louver angle is the same as in cooling mode.

8.4.5.2 Compressor running rules



8.4.5.3 Room over low temperature protection

If room temperature is lower than 10□, compressor will stop and not resume until room temperature over 12□.

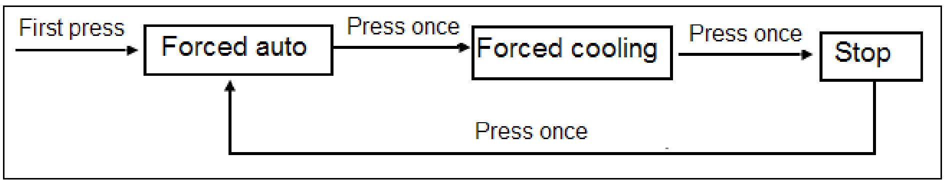
8.4.5.4 Evaporator anti-freezing protection, condenser high temperature protection and outdoor unit frequency limit are valid, and they are the same as that in cooling mode.

8.4.5.5 The outdoor fan operates same as in cooling mode.

8.4.6 Forced operation function

8.4.6.1 Enter forced operation function:

Pressing the touch button once, the machine will transfer into forced auto mode, if pressing the button once again, the machine will turn into forced cooling mode, the third pressing will stop the unit, and the forth pressing is the start of the cycle of forced auto mode, forced cooling mode and stop. Refer the following chart:



8.4.6.2 In forced operation mode, all general protections and remote control are available.

8.4.6.3 Operation rules:

Forced cooling mode:

The compressor runs at F2 frequency and indoor fan runs as breeze. After running for 30 minutes. the

machine will turn to auto mode as 24℃ setting temperature.

Forced auto mode:

The action of forced auto mode is the same as normal auto mode with 24℃ setting temperature.

8.4.7 Timer function

8.4.7.1 Timing range is 24 hours, and the minimum resolution is 15 minutes.

8.4.7.2 Timer on. After turning off, the machine will turn on automatically when reaching the setting time.

8.4.7.3 Timer off. After turning on, the machine will turn off automatically when reaching the setting time.

8.4.7.4 Timer on/off. After turning off, the machine will turn on automatically when reaching the setting “on” time, and then turn off automatically when reaching the setting “off” time.

8.4.7.5 Timer off/on. After turning on, the machine will turn off automatically when reaching the setting “off” time, and then turn on automatically when reaching the setting “on” time.

8.4.7.6 The setting time is relative time.

8.4.7.7 The tolerance of timer is 1 minute per hour.

8.4.8 Sleep function mode

8.4.8.1 Operation time in sleep mode is 7 hours. After 7 hours the AC quits this mode and turns off.

8.4.8.2. Operation process in sleep mode is as follow:

After pressing ECONOMIC or SLEEP button on controller, the machine will turn into sleep mode.

When cooling, the setting temperature rises 1℃(be lower than 30℃) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed as low speed.

When heating, the setting temperature decreases 1℃(be higher than 17℃) every one hour, 2 hours later the setting temperature stops decreasing and indoor fan is fixed as low speed.(Anti-cold wind function has the priority)

8.4.8.3 Timer setting is available

8.4.8.4 When user uses timer off function in sleep mode(or sleep function in timer off mode), if the timing is less than 7 hours, sleep function will be cancelled when reaching the setting time. If the timing is more than 7 hours, the machine will not stop until reaches the setting time in sleep mode.

8.4.9 Auto-Restart function

The indoor unit is equipped with auto-restart function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit will resume the previous operation setting (not including Swing function) automatically after 3 minutes when power returns.

If the memorization condition is forced cooling mode, the unit will run in cooling mode for 30 minutes and turn to auto mode as 24□ setting temp.

If A/C is off before power off and A/C is required to start up now, the compressor will have 1 minutes delay when power on. Other conditions, the compressor will have 3 minutes delay when restarts.

8.4.10 Automatic panel function

8.4.10.1 The automatic panel is forced to turn to the closing direction at an angle of 50° when the unit is getting through the power, and this action is not affected by any signal from remote controller.

8.4.10.2 When the unit is turned on, the panel is opened automatically at an angle of 50° , then the horizontal louver will be opened.

8.4.10.3 When the unit is turned off, the panel is closed automatically at an angle of 50° , then the horizontal louver will be closed.

8.4.10.4 If the panel needs moving when the horizontal louver is in action, the unit will stop the horizontal louver and then carry out the action of the panel. After ending the action of the panel, the horizontal louver will continue its action.

8.4.11 Ionizer (Clean Air) function

8.4.11.1 Clean Air function is available only when the A/C is on, and it's controlled through remote controller.

8.4.11.2 After the A/C being turned on, the Clean Air function is switched on when the A/C receives FRESH CODE at first time, and ionizer is switched off when the A/C receives the CODE again. It's a circle.

8.4.11.3 After starting the Clean Air function, the ionizer can work only when the indoor fan motor is running. If the indoor fan motor is off, the ionizer also stops working, even though the Clean Air function is available.

8.4.11.4 Switching the running mode will not stop the ionizer. When turning off the A/C, the ionizer is

also turned off.

9. Troubleshooting

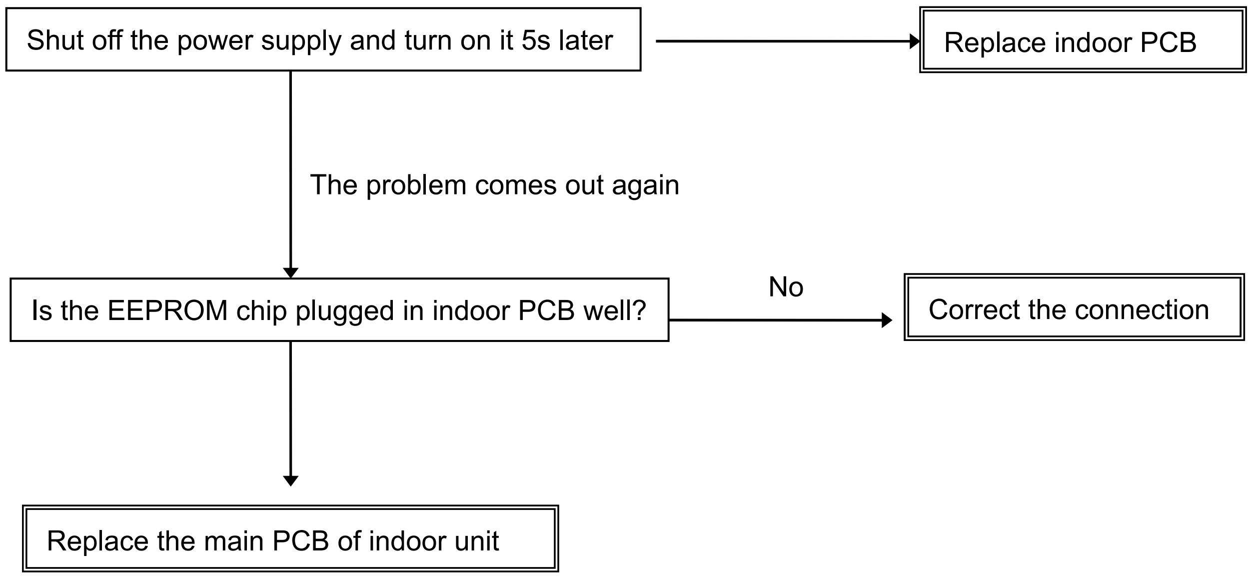
9.1 Indoor Unit Error Display

Display	LED STATUS
E0	EEPROM parameter error
E1	Indoor / outdoor units communication protection
E2	Zero-crossing signal error
E3	Indoor fan speed out of control
E5	Open or short circuit of outdoor temperature sensor
E6	Open or short circuit of room or evaporator temperature sensor
E7	Outdoor fan speed out of control
P0	IBM malfunction or IGBT over-strong current protection
P1	Over voltage or too low voltage protection
P2	Temperature protection of compressor top.
P4	Inverter compressor drive error

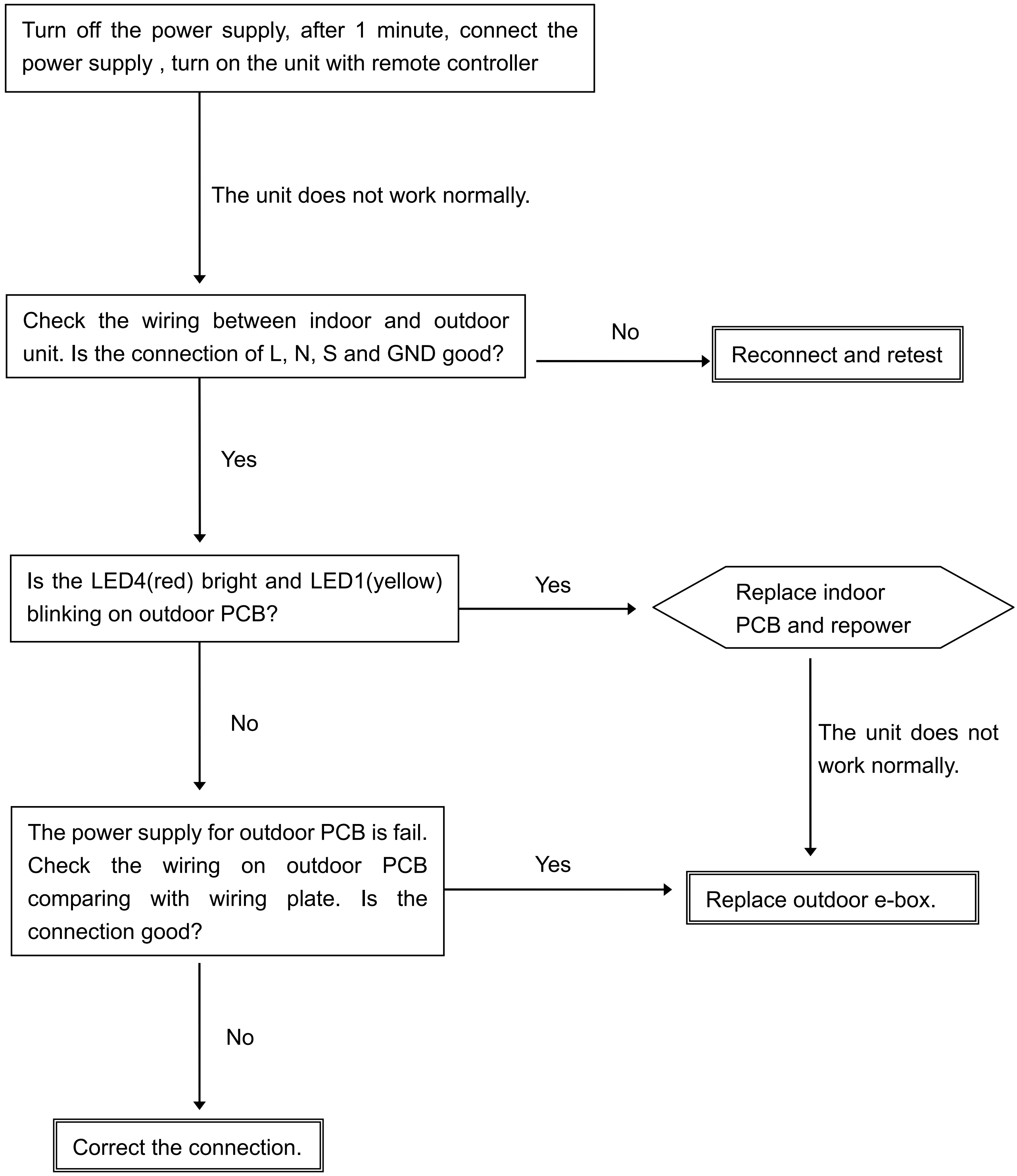
Note: E4 & P3: Reserved function

9.2 Diagnosis and Solution

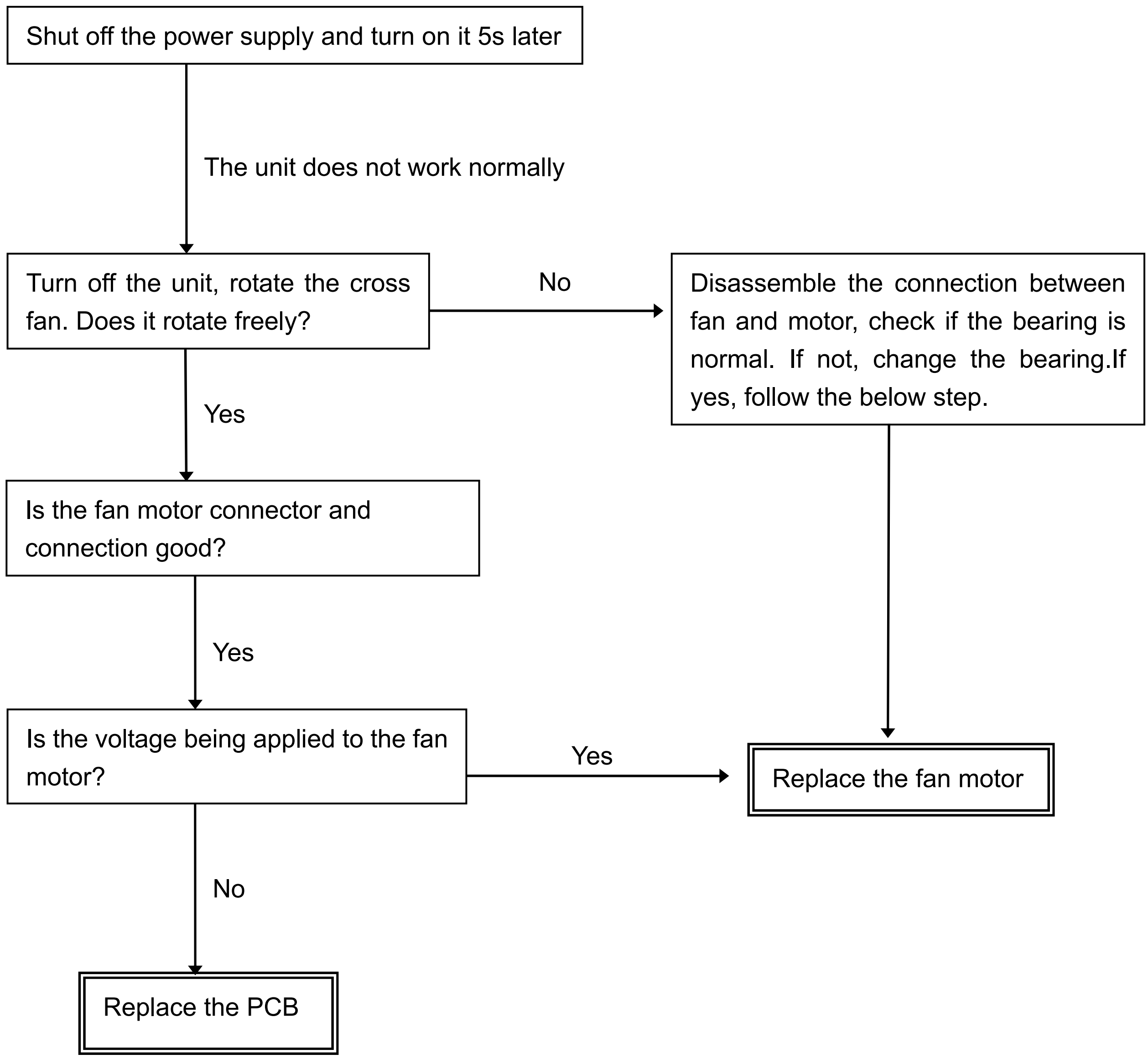
9.2.1 EEPROM parameter error diagnosis and solution



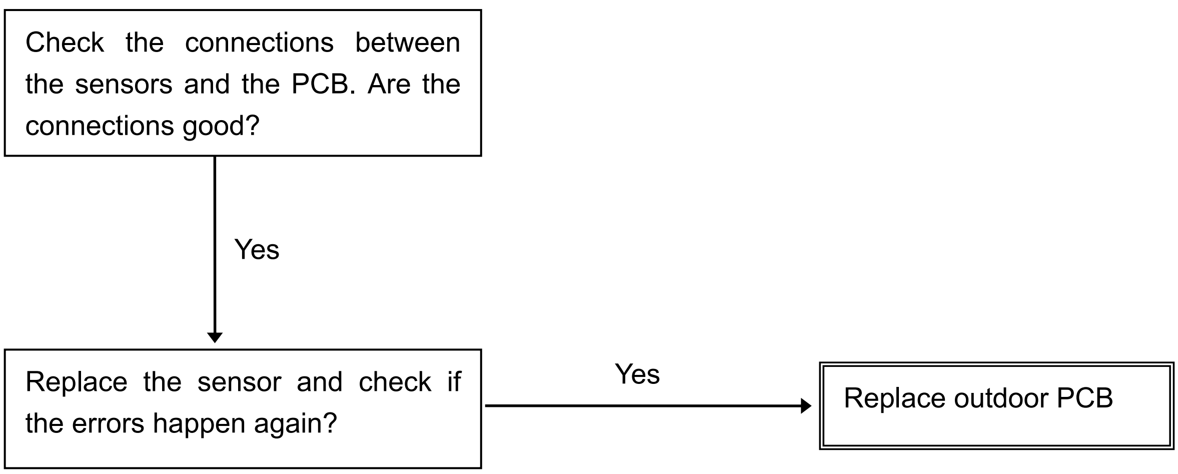
9.2.2 Indoor / outdoor units communication protection error diagnosis and solution



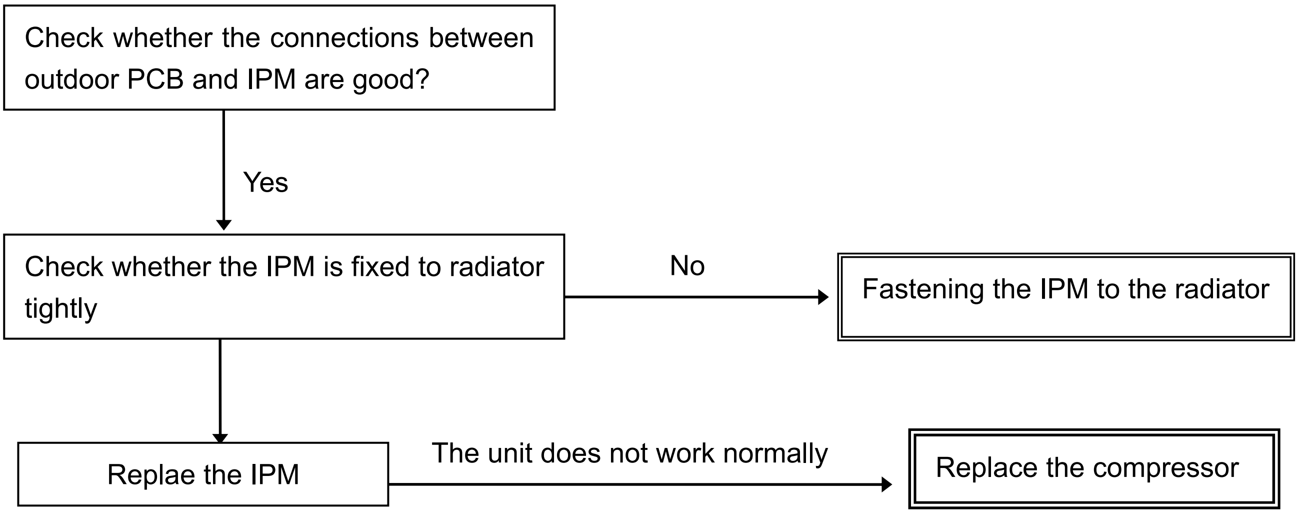
9.2.3 Fan speed out of control diagnosis



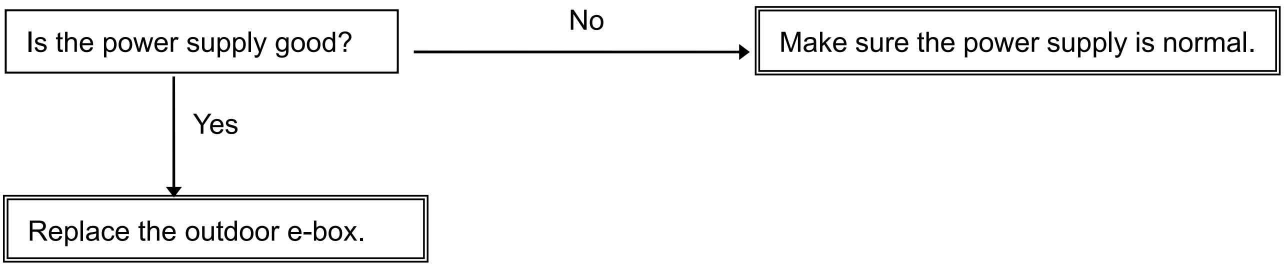
9.2.4 Open or short circuit of temperature sensor diagnosis and solution.



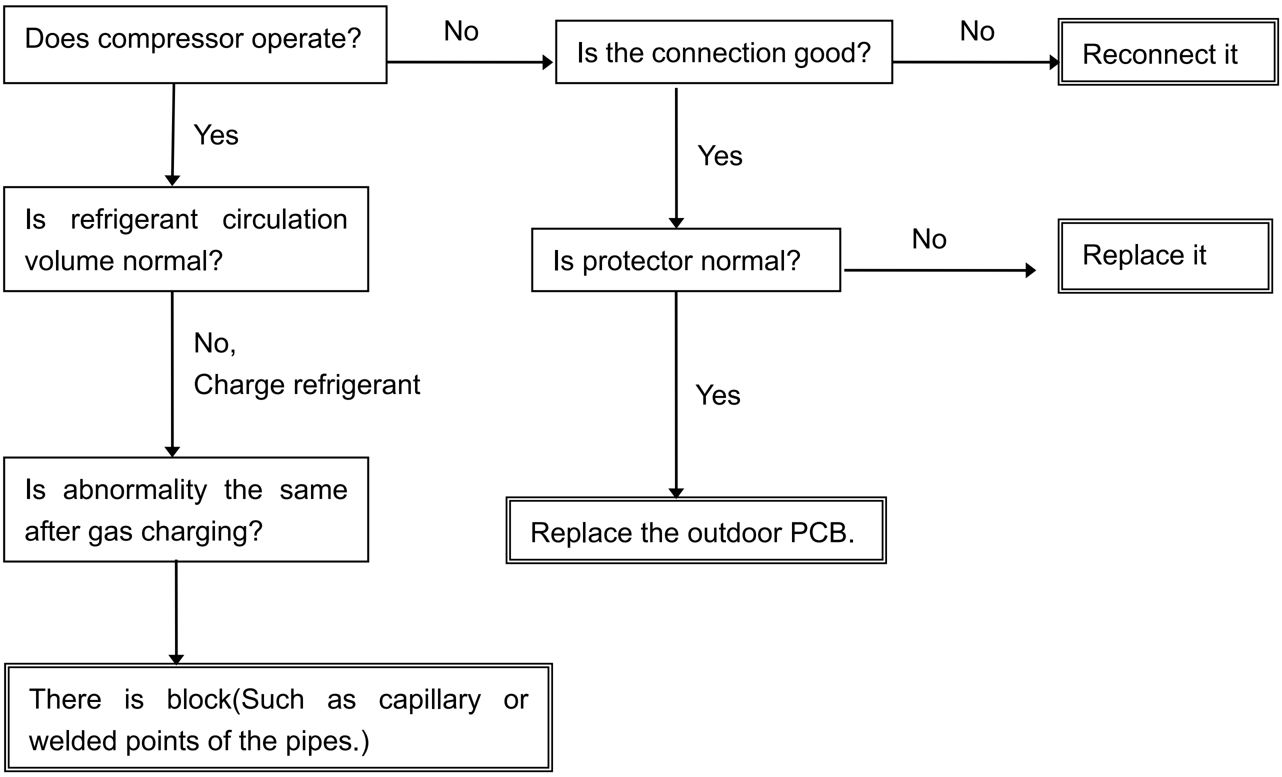
9.2.5 IGBT over-strong current protection diagnosis and solution.



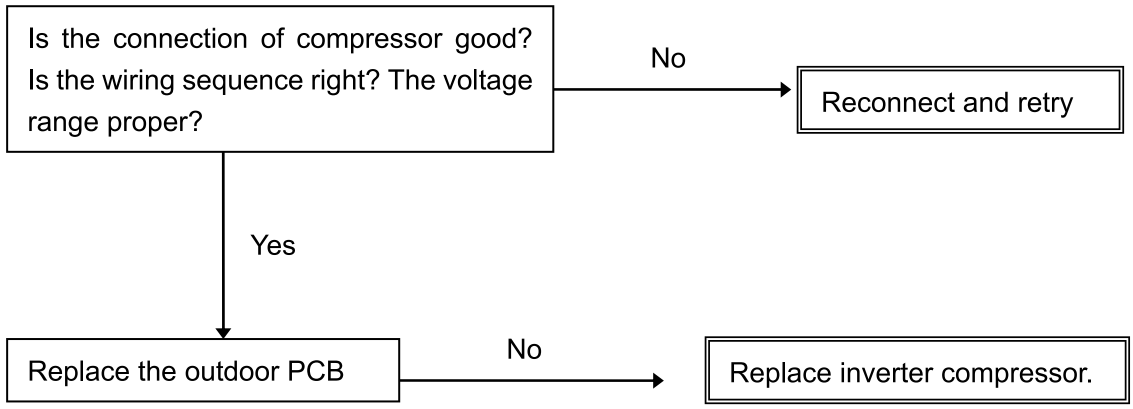
9.2.6 Over voltage or too low voltage protection diagnosis and solution.



9.2.7 High temperature protection of compressor top diagnosis and solution.



9.2.8 Inverter compressor drive error diagnosis and solution.



9.2.9 Zero crossing detection error

This is alarm signal when the main chip can't detect over-zero signal. When such failure occurs, the main control board must have fault.